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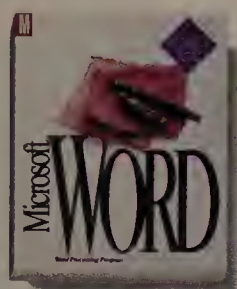
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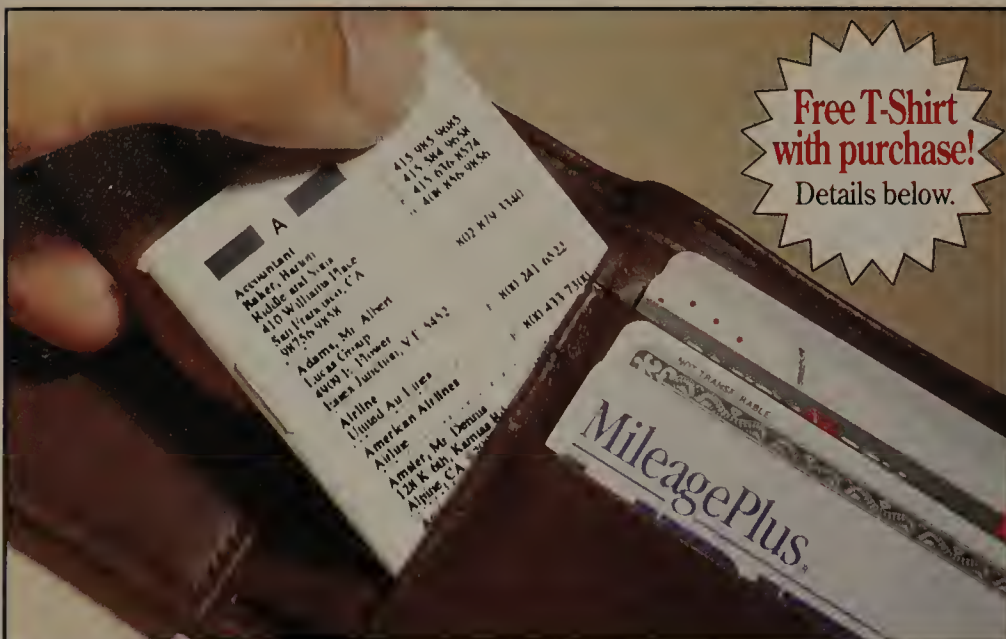
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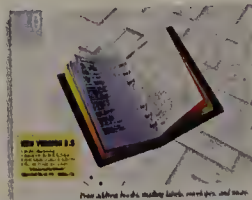
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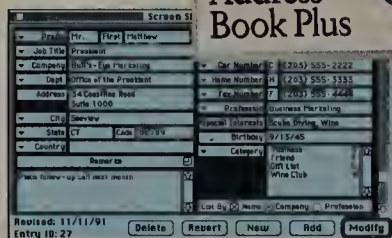
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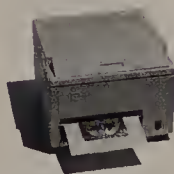
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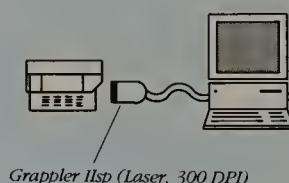


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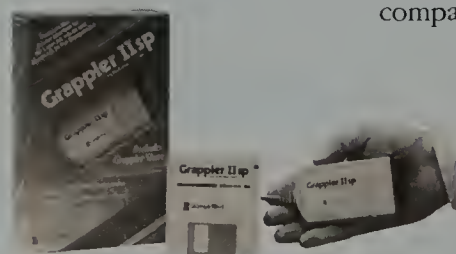
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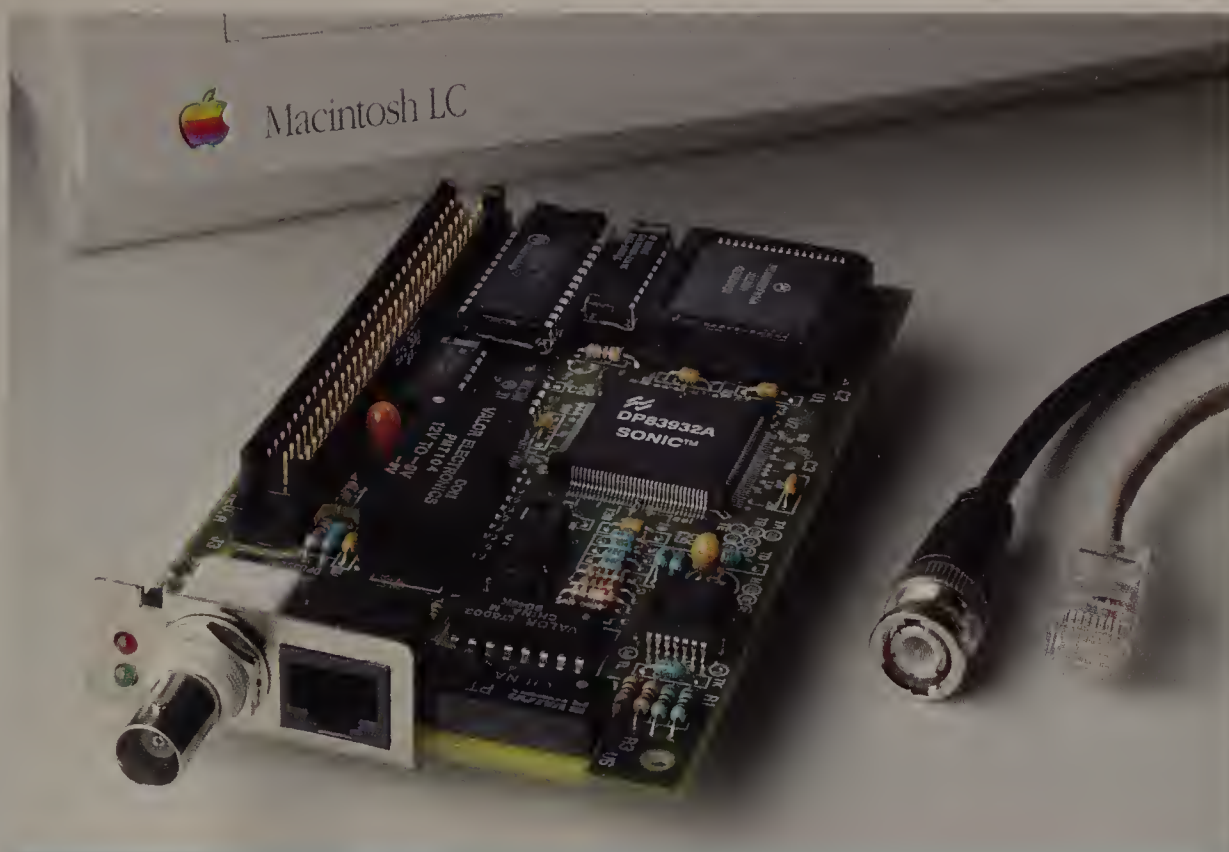
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QUESTIONS AND QUICK TIPS Direct questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to: Quick Tips, Lon Poole.

CONSUMER ADVOCATE Been burned? Really steamed? Direct your concerns (by mail or electronically) to: Conspicuous Consumer, Deborah Branscum.

NEW PRODUCTS AND UPDATES Direct press releases and product announcements (by mail or electronically) and shrink-wrapped software upgrades (by mail or courier) to: New Products Editor.

BUG REPORT AND TURKEY SHOOT Submit suggestions by mail (write Bug Report or Turkey Shoot on the envelope) or electronically (indicate Bug Report or Turkey Shoot in subject field). Please include your phone number.

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Do You Make These Six Common Mistakes On Your Taxes?

Six common mistakes can cause you big headaches on your taxes. An oversight here, an omission there. From unnecessary tax payments to full blown IRS audits -- you can end up paying too much ... or worse.

But now, using MacInTax® and your personal computer, you can avoid these simple but costly mistakes:

1 The Arithmetic Error

Today, even the simplest forms contain complex calculations. And with all the late-night scrambling, an innocent mistake could cost you plenty.

2 The Transcription Error

With all those numbers being juggled from schedule to schedule, it's no wonder the figures are so often transcribed incorrectly or entered on the wrong line.

3 The Omitted Form

Even "ordinary" returns require anywhere from six to a dozen forms to complete. It's easy to miss one ... or end up rushing all over town to find the one you need.

4 The Misinterpreted Instruction

At best, IRS instructions can be tough to understand. At worst they can be mind-boggling. What you need are clear directions in plain English.

5 The Overlooked Deduction

You'd have to be a professional tax preparer to know all the deductions you're entitled to. If you miss just one, it could cost you hundreds of dollars.

6 The Exceeded Guideline

The fastest way to trigger an IRS audit is to exceed the "normal" range on one of your deductions. You need to know what the IRS looks for on a line-by-line basis.

When you do your taxes with MacInTax, mistakes like these are virtually impossible. And filing your taxes couldn't be easier.



America's #1 Tax Software

MacInTax is America's #1 best-selling Macintosh tax preparation software -- no others come close! With MacInTax on your Macintosh, you can completely and accurately prepare your income taxes in just a few hours.

Here's how easy it is!

- Gather your records and receipts.
- Enter your data into MacInTax just once.
- Print out, sign and drop in the mail.

MacInTax does the rest. MacInTax asks you step-by-step questions and shows you how to enter

every item. And like a good tax advisor, MacInTax helps you identify every deduction you can claim.

Then MacInTax makes all the calculations, checks for accuracy and consistency, and transfers every number to the proper lines on the proper forms. And, MacInTax prints every form you need in IRS-approved format right on your own printer -- ready to sign and mail (or file electronically, if you prefer, for a faster refund).

Macworld Magazine says "... the most successful special-purpose program yet for the Macintosh ..." Try it for yourself. Free. We know that if you try it, you'll never go back to doing your taxes the old-fashioned way again. So we'll send you MacInTax on an unconditional free trial basis: *If you don't like it, you don't pay for it!*

Free Bonus!

Plus, when you buy MacInTax, we'll send you a FREE copy of The Norton Utilities Version 1.0 for the Macintosh as a special free bonus. The Norton Utilities is America's best-selling disk repair and data recovery program. It performs the most extensive diagnosis and repair of any utility program for the Macintosh. And it's yours free when you buy MacInTax.



☐ Yes, I'll try MacInTax FREE!

ChipSoft

Rush me a FREE trial copy of MacInTax ASAP (I pay just \$8.50 shipping now). I'll try it free for 30 days, and if I don't like it for any reason, I'll just send it back and owe nothing (shipping fee is non-refundable). If I do keep it, I'll be charged \$79.00 (\$20.00 off the regular price) after my 30-day free trial.

FREE BONUS: Your free copy of The Norton Utilities will be sent upon full payment.

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Bill My: ☐ Visa ☐ MasterCard ☐ Discover ☐ Amex
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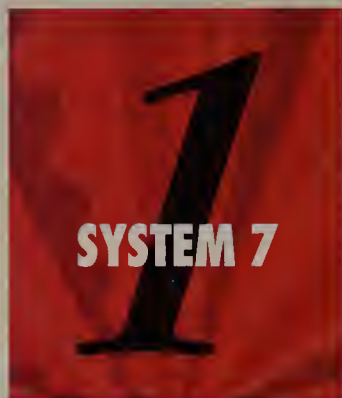
Pay now in full and we'll send both Norton and MacInTax right away -- and we'll pay the shipping!
☐ Yes, charge my credit card in full now. (\$79.00)
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MacInTax requires Macintosh Plus, System 4.2 or higher and hard drive. California residents please add 7.25% sales tax. Offer expires 4/15/92 -- not valid with any other offer. Offer also includes free HeadStart Edition for orders received through 12/31/91. MacInTax® is a registered trademark of ChipSoft CA, Corp. The Norton Utilities is a trademark of Symantec Corporation. The Norton Utilities Version 1.0 is not fully compatible with System 7.

7 REASONS WHY YOU NEED A NEW WORD PROCESSOR.



Because you're ready to see what System 7 can do.

Apple calls System 7 the biggest improvement in Macintosh since Macintosh. And WordPerfect® is now System 7 savvy.

So now (among lots of other new things), WordPerfect will automatically keep track of changes that you (or someone else) might make to imported files (charts, graphics, whatever), and update

your WP documents accordingly.

Now, a change

made in one place

can be a change made

in many places. Apple

calls it "Publish and

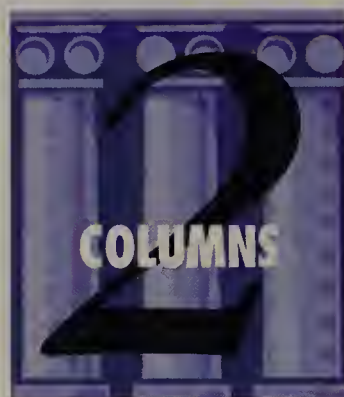
Subscribe," and it works

between programs on your hard

drive, as well as among people on

your network. Publish and Subscribe assures you that your documents will always reflect the latest information available.

And it's just one of the new System 7 tricks that WordPerfect 2.1 has mastered.



Because WordPerfect does columns better than the Greeks.

Pick a starting point, click on the ruler, and see your text in two columns. Or in three columns. Or five columns. With vertical rules beside or between them, if you like.

Drag a guide on the ruler and try *unequal* columns. Highlight text in a box that jumps across columns.

Go crazy with the design, or stick with the tried-and-true.

The point is, WordPerfect gives you formatting options that other word processors don't. And exploring them couldn't be much easier.



Because you'd use more graphics if using them were easy.

WordPerfect not only gives you full control over the placement of graphics in your text, it also gives you a color drawing program for modifying imported artwork (or starting over from scratch) without ever leaving the program.

You can print graphics under your text (as "water-

marks") or on top (as overlays).

You can use the drawing tools to rotate text to any angle that strikes your fancy (something many page-layout programs still can't do).

And WordPerfect gives you 36 border styles and 64 fill patterns — which you can use in any of 256 colors — for highlighting graphics, paragraphs, columns, pages, even blocks of text.



Because a movie is worth who-knows-how-many words.

If a picture is worth a thousand

words, what's a movie

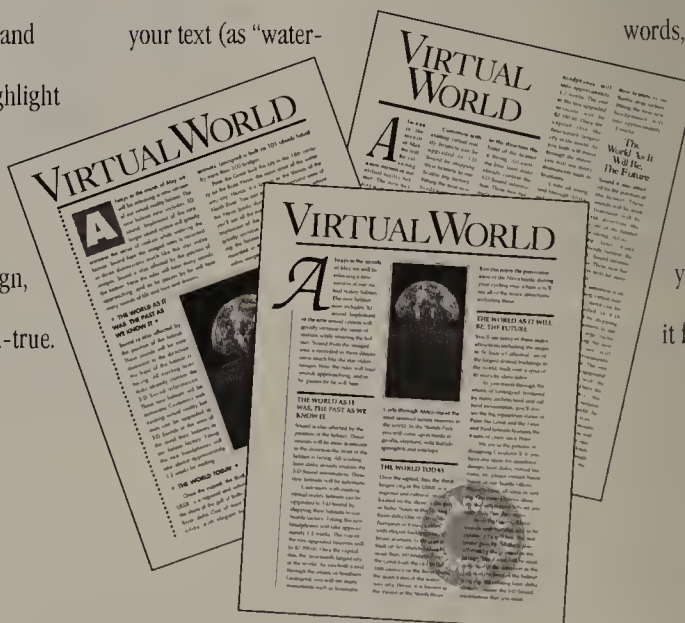
worth? With

WordPerfect

and QuickTime,

you can calculate

it for yourself.



Apple's QuickTime is a new technology that lets you work with digital video and sound as easily as you now work with text and graphics files.

Imagine being able to place (and size) a QuickTime movie anywhere in a document. You could add urgency to a memo with a few well-chosen words delivered "live." Or help an audience visualize your latest brainstorm with a 3-D simulation they can start, stop and replay.

We have a feeling that words can't begin to describe all the ways you'll think of to use it.



Because you get tired of repeating yourself, yourself, yourself.

Perhaps because they've heard it's a powerful programming

language, WordPerfect's macro editor intimidates some people at first. It shouldn't.

It's no more complicated than a tape recorder. Click "record" and it memorizes your keystrokes. Click "play" and it repeats them.

With no more knowledge than that, you can create a WordPerfect macro. And can spare yourself the effort of formatting M-E-M-O-R-A-N-D-U-M, T-o-:, F-r-o-m: (and so on) across the top of the page every time you want to fire off a memo, for example.

But simple as recording your own macros can be, we also ship a number of them with the program. For formatting addresses to print on envelopes. Placing "drop caps" at the start of paragraphs. And other jobs you'd rather not do twice.



Because some people work on DOS computers.

You want the word processor that's right for you. If your choice happens also to be the choice of millions of others — with other computers — so much the better.

That's why WordPerfect is such a good choice. Lots of DOS users use WordPerfect. As well as UNIX, VMS and other users. If you ever find your Mac on a network with other computers,

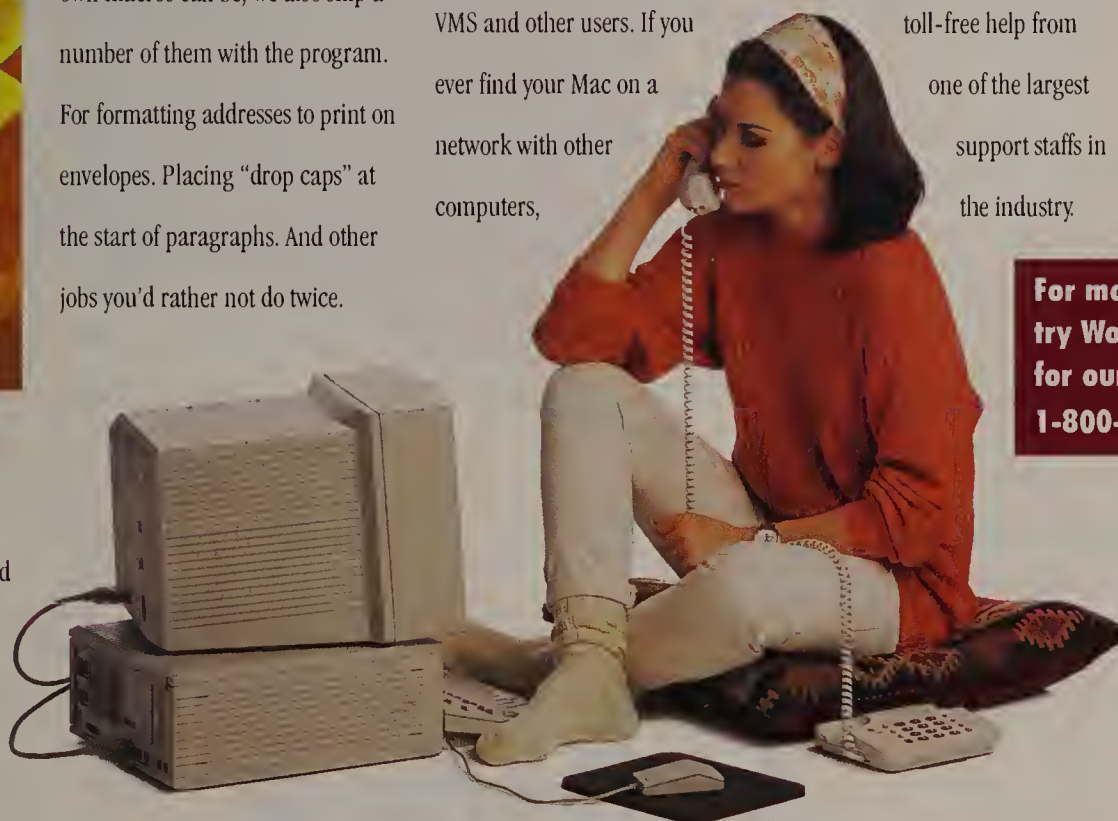
WordPerfect's compatibility can save you a lot of aggravation. Not to mention a lot of reformatting.



Because even if you never call us, it's nice to know we're here.

Like any good Mac program, WordPerfect 2.1 is easy to use. But unlike many Mac programs, you're not on your own with it. You get toll-free help from one of the largest support staffs in the industry.

**For more reasons to try WordPerfect, call for our free video.
1-800-526-7820**



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WHEN WAS THE LAST TIME A DRAWING PROGRAM MADE YOUR PALMS SWEAT, YOUR PULSE RACE, AND YOUR HEAD SPIN.

UNLEASH THE AWESOME POWER OF CANVAS 3.

Fasten your seat belt and get ready to take the incredible new Canvas 3.0 for a spin. Its exceptional performance and nimble handling make Canvas 3.0 the hottest precision drawing program on the market. And its formidable list of major enhancements puts it miles ahead of anything else on the road.

CRUISE INTO THE FUTURE TODAY. Canvas 3.0 is System 7 Savvy with all of the features Apple® wants to see in System 7 graphics applications. Publish & Subscribe, Balloon Help™, AppleEvents™, and 32-bit memory are fully supported. What's more, Canvas 3.0's breakthrough

Open Architecture technology lets you add new tools, effects and file translators with ease, at any time.



IT WILL LEAVE YOU SPEECHLESS. Canvas 3.0 offers a wide range of professional text

handling features. Fractional leading and kerning. Tab support within

text blocks (left, right, center, decimal). Subscript and superscript text. You can even bind text to any curve.

Wrap text around or encrust it within irregular shaped objects. Fully justify and slant text margins.

Apply character by character font scaling. And convert TrueType™ and PostScript® Type-1 fonts into their Bézier curve outlines.

NOTHING HANDLES CURVES BETTER.

While other drawing programs make you draw Bézier curves by "connecting the dots", Canvas 3.0's freehand tool lets you create any curve by simply drawing it. And it gives you unparalleled Bézier curve editing power -- from multi-point selection and editing to automatic object conversions, combinations, and blends.

You even get centerline auto tracing of scanned images.

GO WHEREVER YOU WANT.

With enhanced color capabilities, including a built-in process (CMYK) color separator, PANTONE® color support, and automatic gradient fills and blends, Canvas

3.0 is blowing the doors off the competition. But it doesn't top out there. You'll also find technical features like custom hatching, parallel lines and curves, and dashed lines, curves and borders. Automatic dimension lines. And a Smart Mouse™ drawing aide for precise alignments. What's more, there are new built-in file translators for important multi-platform formats like EPSF, TIFF, CGM, DXF™, IGES, and Illustrator®.

TAKE THE CHECKERED FLAG. Why drive some sedate sedan when you can own the road with the new Canvas 3.0? It's incredibly easy to use -- and the list price of just \$399 simply adds to the thrill. So, take a deep breath. Buckle up. Double click. And unleash the awesome power of Canvas 3.0. You're in for the ride of your life.



TIRED OF YOUR OLD SEDATE SEDAN?

Well, trade-in any used model of MacDraw®, MacDraft®, Illustrator® or Freehand™ for a brand new Canvas 3.0 dream machine for only \$149.00. Mail your original program disk with payment to our main address below. Include your MC, VISA or Amex card number, account name and expiration date, or a check in US dollars drawn on a US bank. Add \$10.00 shipping. Offer valid in the United States and Canada. Expires on 3/31/92. Please allow four to six weeks for delivery.



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Circle 57 on reader service card

MacBulletin

L A T E - B R E A K I N G N E W S

Apple cuts prices again on most of its CPUs. The PowerBook 100 2/20 (with 2MB of RAM and a 20MB hard drive) dropped from \$2299 to \$1999. The Classic 2/40 went from \$1499 to \$1349. The Classic II 4/40 now lists for \$1699, down from \$2049. The price of the Macintosh LC 4/40 plummeted nearly \$1000, to \$1699. The IIsi 3/40 went from \$3769 to \$2499, and the IIsi 5/80 was cut from \$4569 to \$2999. The IIfx 5/80 went from \$5969 to \$3999. The Mac IIfx 4/80 now costs \$5799 versus its old price of \$8069. Apple also cut the StyleWriter from \$599 to \$399. The changes affect prices in the United States only.

System 7 Update: Apple has released a bug-fix for System 7 called System 7.0.1 Tune Up. Its major features are more efficient use of memory and faster printer drivers. For more information, see "Taking Stock of System 7" in this issue.

Apple Electronics? Apple CEO John Sculley recently reiterated the company's plans to pursue the consumer electronics market. During 1992, Sculley said, Apple will ship two Macs with built-in CD ROM drives, one marketed through electronics stores and department stores. Sculley also described plans for non-Macintosh hand-held products, which he called personal digital assistants.

Whistle-Blower BBS: U.S. Rep. Robert Wise, D-W.Va., has established the Whistleblower Bulletin Board, an electronic BBS for citizens to report on government waste or fraud. Wise's office says the service is confidential. The number is 202/225-5527; set modem for 300, 1200, or 2400 bps, 8 data bits, no parity, 1 stop bit.

Alias's New Deal: Alias Research (800/267-8697), which launched its 3-D illustration tool Sketch at \$1995, has decided to cut the price to \$995 and remove copy protection. Customers who bought the early release will be refunded \$1000.

Solutions Dissolves: Solutions Inc. has ceased operation and is selling off its product line. Portfolio Systems (408/252-0420) has purchased SmartScrap & The Clipper and SuperGlue; Delrina (416/441-3676) has taken over BackFax.

The Trashman Cometh: Two new utilities are devoted to managing deleted files. DLM Software's (619/283-2343) \$69 Shredder erases deleted files according to Defense Department specifications. HandOff's (214/727-2329) \$69.95 TrashMaster enables you to select files to be deleted from the Trash using a hierarchical menu. Both products support scheduling long disk-scrubbing operations for idle times.

Letraset Trims Product Line: Fractal Design (408/688-8800), which wrote ColorStudio and ImageStudio for Letraset (201/845-6100), has assumed U.S. marketing for the two products. Letraset says it will continue to market them abroad.

Softsync's Expertise: All products in Softsync's new Expert line of software will cost less than \$50. First to ship is \$49.95 Expert Color Paint, a 32-bit package with gradients, multiple undos, image-editing tools, and antialiasing. The Expert line will include an astronomy program, a home floor planner, a word processor, and a diet program. Softsync (305/445-0903) also publishes Accountant Inc. **m**

Only one spreadsheet and all Macintosh. Ri

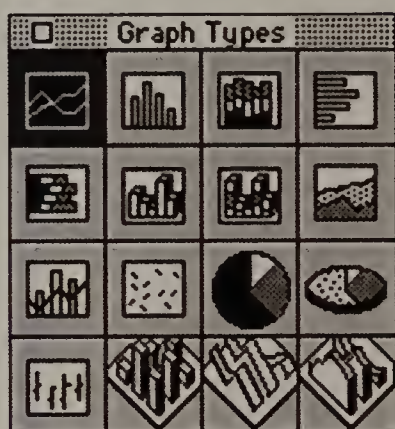
One look and Apple Chairman and CEO John Sculley called it "a spectacular product."* And that's just for starters.

This isn't just another version of Lotus® 1-2-3®, it's a spreadsheet that really grabs hold of the full computing power of Macintosh®. So, everything you've come to love about Mac® computing is now available in 1-2-3.

A full-fledged, no-holds-barred Mac spreadsheet

Because it was designed and built just for Macintosh, Mac users will feel right at home with the menus, tools and the entire working environment of 1-2-3 for Macintosh. It includes features that push the capabilities of System 7 and everything that comes with it to the limit. Like Publish and Subscribe, Apple Events and Data Access Manager, to name a few.

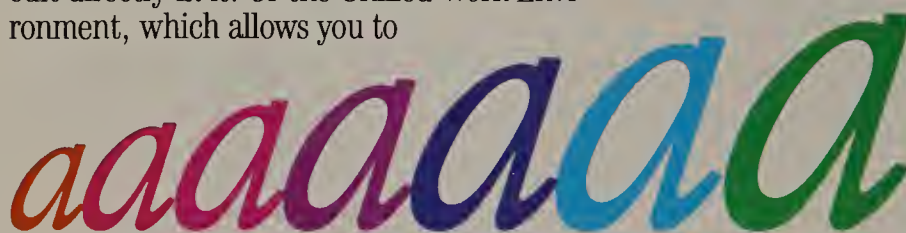
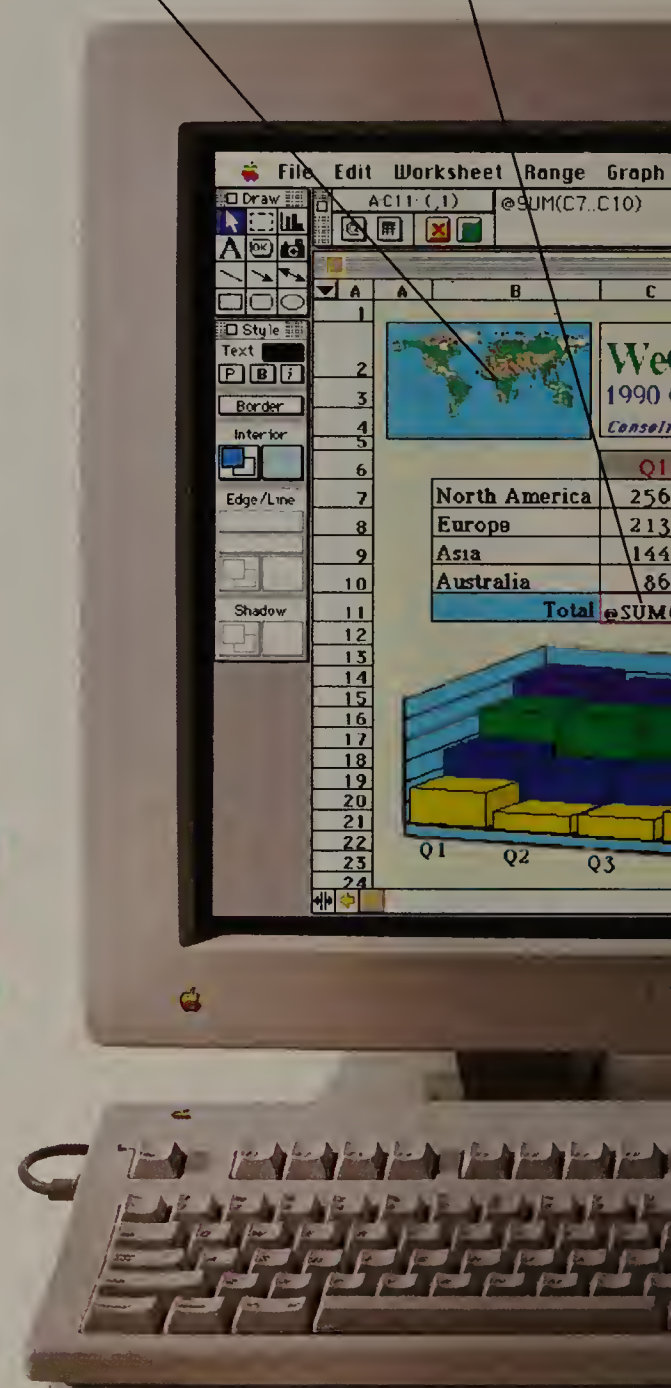
Its innovative "user interface" makes working with data, text and graphics not only fast and easy, but fun. Like In-Cell Editing, which lets you double click on a cell and then type and edit directly in it. Or the Unified Work Environment, which allows you to



1-2-3 delivers the graphing capability Macintosh was made for. Select from hundreds of variations with a palette full of 3-D, pie, bar, area and scatter graphs.

Be manipulative—
Command your worksheet with direct manipulation and formatting of all data, graphs and drawn objects.

In-cell vs. Excel—Enter data or formulas directly into a cell, bypassing the console if you choose. Sounds simple because it is.



Output That Stands Out—Bring your presentations and reports to life with an array of colors, borders, Adobe® type styles, and images. **ATM**

manipulate data, text and graphics all in the same file with one set of menus. Change the color of your data the same way you change the color of your graphics. And directly manipulate data, graphs, drawn objects and scanned images.

1-2-3 for Macintosh delivers the graphing capabilities Macintosh was made for in a way that's incredibly flexible. You get superior

sheet is all 1-2-3 ght down to the core.

Unified Work Environment—The menu never changes and all information resides in one file.

Publish and Subscribe—Change your data and that data will be automatically updated across your network.

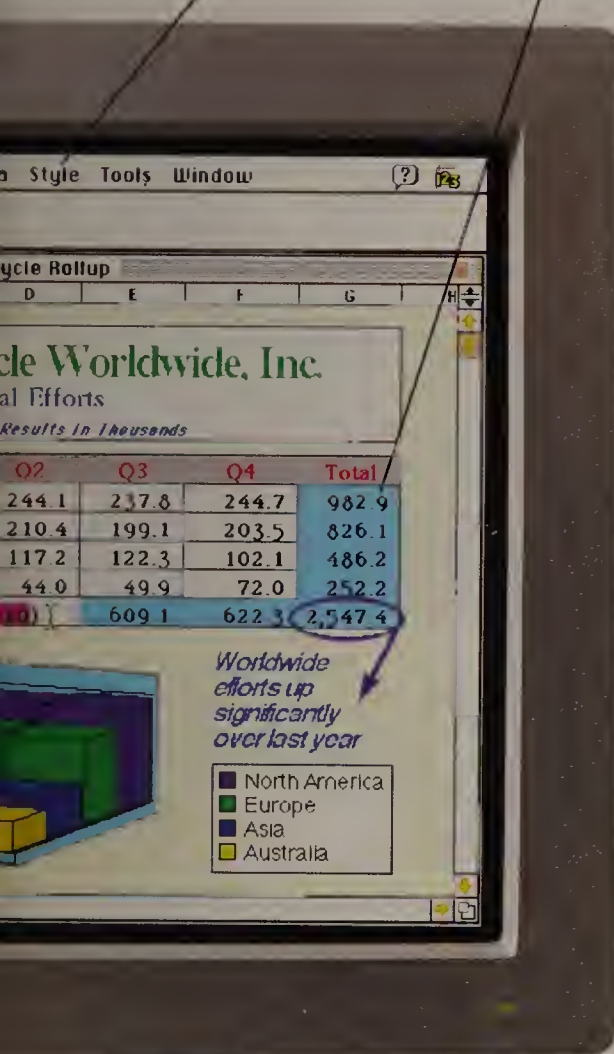
publishing and graphing functions including a rich variety of fonts and color choices. And with print preview, you see exactly what your output will look like, instantly, so you avoid surprises at the printer.

True 1-2-3 Compatibility

1-2-3 for Macintosh is compatible with other versions of 1-2-3, giving you direct access to the spreadsheet used by over 15 million people. It even reads and writes Microsoft® Excel files. So you can make the switch to 1-2-3 and never look back. And never look better.

Nothing delivers on the capabilities of Macintosh like 1-2-3. Maybe that's why the world's best selling spreadsheet is the world's best choice for Macintosh.

It's one of your favorite System 7 features, so why shouldn't Balloon Help™ be part of 1-2-3? No matter where you are on the screen or what function you're in, detailed instructions are just a click away.

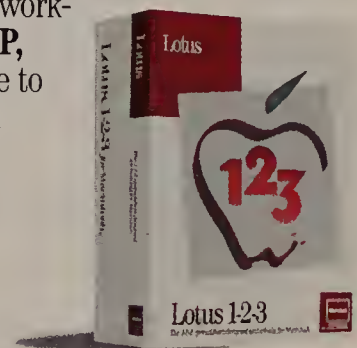


1-2-3 Classic														Menu	
A:A1:															
Worksheet	Range	Copy	Move	File	Print	Graph	Data	System	Quit						
Global	Insert	Delete	Column	Erase	Titles	Window	Status	Page	Hide						

Press the slash key and the 1-2-3 Classic® menu appears on your screen. If you're coming from the DOS environment, this will make it easier for you to access familiar Lotus commands and run macros already written for 1-2-3.

So what are you waiting for?

This is truly a great product for Macintosh. But don't take our word for it. Why not see 1-2-3 for Macintosh for yourself? Visit your favorite dealer for a free working model or call **1-800-TRADEUP, ext. 6433.**** Excel users, be sure to ask about our special upgrade offer.



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*Surge protectors are not lightning arrestors and cannot be guaranteed to protect against direct hits.

Circle 20 on reader service card

Exploring January's Macworld Expo

BY JERRY BORRELL

IT'S BEEN A LONG WHILE SINCE I've seen a Macworld Expo with the enthusiasm of this January's. Hundreds of happy Macintosh developers have reported that tens of thousands of Mac fans voted with their wallets. True, pent-up demand and cheap show prices helped, but great products were the primary force convincing people to buy.

Booming CPU sales have lured hordes of new users to the show. Apple's PowerBooks have created a market for add-ons. System 7 may have slowed application sales over the past few months; many users on the show floor expressed confusion about the shift to 7, saying they didn't switch because they were unsure about compatibility with their applications. Others said they were afraid to buy new applications or upgrade old ones because they assumed they would then have to upgrade to 7. This confusion remains, but purchasers seemed to be swayed by the strength of the new offerings and the energy of the show.

The Installed Base Is Upgrading

BY NOW I WOULD HAVE EXPECTED TO see the million-plus owners of Mac Classics in upgrade mode, but Mac developers at the Expo told me the majority of customers are interested in upgrades for Mac Pluses, SEs, and SE/30s. The products being built for those machines are, in order of volume, monitors, memory, CPU accelerators, and networking add-ons.

A new trend, perhaps driven by the development of SCSI video interfaces for the PowerBooks, is SCSI video interfaces for the Plus and SE products. By August's Expo we're certain to see video for the Classic handled in the same way—a welcome relief since the Classic II design made it even harder for Mac developers to add a monitor to the Classic chassis.

Another upgrade trend, driven primarily by users of System 7, is toward more memory. Apple is still grappling with how to present users with a 2MB system, but the reality is that users need about 5MB to have a usable system running 7. And if Mac owners need color, the bottom line for memory is that they never have enough. Period. Just lots of dialog boxes asking if an application should be opened despite the shortage of memory.

High Performance: All We Can Get

I CONSIDER THIS CATEGORY OF PRODUCTS apart from the general upgrade needs of older CPUs because it is driven by a different group, those needing more performance than the Mac is able to provide. The earlier group seems to be driven primarily by a concern that their investment be preserved and that they be able to use new versions of mainstream applications.

Several groups of acceleration products were shown at the Expo, including higher-speed 68040 microprocessors from Fusion Data Systems, Radius, and Newer Technology (which offered a 33MHz 68030 and 256MB RAM combo). Some companies repackage an entire system—for example, Sixty Eight Thousand builds a higher-performance Macintosh based on existing Mac system boards and parallel processors (primarily Radius Rocket accelerators ganged on the NuBus and intended for specialized graphics software). Specialized coprocessors were also shown—Yarc Systems put an AMD 29050 chip on a RISC coprocessor board to perform high-speed processing for scientific/technical applications, such as simulations. Atto Technology leads in the category of high-performance add-ons. Its fire-breathing SiliconExpress II coprocessor board combines enough RAM banks and high-speed throughput technology to make even a mad scientist (or color prepress service bureau) a happy camper.

Network acceleration is led by Ethernet connectors, routers, and hubs. I believe that January's Expo was the first show at which these products have outweighed developments for LocalTalk. Clearly, Mac users are making a shift to Ethernet, and the reward in performance is worth the effort. If Apple's implementation of Phase 1 and Phase 2 Ethernet technology can be sorted out, Ethernet will be nothing short of a boon on networks, and prices for its use are falling rapidly.

Storage companies like FWB, CMS Enhancements, and others have chased the latest technology in large-capac-

ity drives in order to improve the data-transfer rates (and other, more esoteric performance issues) of hard drives. Other vendors such as Newer Technology and Storage Dimensions have been producing NuBus coprocessor boards implementing SCSI-2 technology that dramatically improves hard drive performance. More notable, however, is that RAID (Redundant Array of Inexpensive Disks) technology from supercomputers and mainframes appeared for the first time at a Macworld Expo. RAID technology supports banks of large-capacity (multiple-gigabyte) hard drives. The vast Macintosh market for desktop publishing and graphics now demands this kind of size—but the clamor for video (with its attendant size and speed requirements) creates even more demand.

Storage: How Much Is Not Enough?

IN TERMS OF CAPACITY (I KNOW I'LL be labeled a high-end user), Mac graphics users are thinking of drives larger than 100MB; users of professional graphics applications will need 300MB drives if they do four-color work. Video, as I noted above, has made storage requirements even greater. For video users (and DTP users are not far behind), 500MB-to-1GB drives will be the range of choice in 1992. Thankfully, these capacities are becoming available in full-height, 3½-inch form factors. Towers are still used for

multigigabyte configurations such as Loviel Computer Corporation's 60GB RAID disk array.

I was happy to see so many shipping 3½-inch optical drives—Microtech, PLI, Pinnacle, Storage Dimensions, and Procom Technology all demonstrated optical drives with floppy-size platters. (I was less happy to hear reports of problems with some Sony-based opticals.) All I can say is sign me up. A 128MB floppy—great. PLI showed a drive at a price of \$1529!

Shown, but missing in action, were the 2½-inch drives that Jasmine and others advertised earlier. Most people thought these little cigarette



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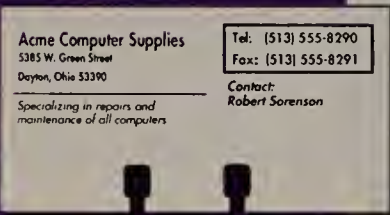

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pack-size drives would appear in 1991; now I wonder if the technical problems will allow them to be sold (as reliable products) in 1992.

Utilities: Desktop and Compression

THERE WERE TWO MAJOR SOFTWARE categories worth noting at the show: desktop organizers and compression programs. Before moving to these more general groups of utilities, I should point out that Dave Winer of More fame has finally shipped Frontier, the wirehead product of the year. Admittedly its scripting functions are a boon primarily to the programmer community, but Frontier is needed in absence of Apple advancing a scripting language. (And Dave has his eye on a wider community of Mac users. By 1993 we'll be writing more about him.)

A fast-growing number of products are aimed at reducing the information glut on computers. Lead by On Location from On Technology, these next-generation products also address the confusion added by the shift to System 7. Yes, it's nice to have all that information, but I feel less at home on my desktop since I converted to 7. Connectix demonstrated a future product, called InfoLog, intended to track information entered into any document. HAM from Microseeds Publishing provides easier menu access. Hand-Off II from Connectix is aimed at managing the entire desktop. Teknosys showed Help 1.0.1, a utility that informs users of problems with 7. Scott Wiener, the lead developer of FullWrite, has a new company called Common Knowledge, which will soon release another information manager. Bananafish Software showed version 2.0 of ThoughtPattern, a personal information manager, and Pastel Development was selling its PIM product, DayMaker.

Among the compression products, including AutoDoubler from Salient, and DiskFit Pro from Dantz, StuffIt Space-Saver from Aladdin is taking a new approach. It compresses all data sent to the hard drive rather than at the file level, purportedly doubling the capacity of any hard drive. Sounds pretty good—I can't wait to test how it works with graphics.

QuickTime: Editors, Movies, Hardware

THIS EXPO WAS LARGELY A QUICKTIME event. Adobe is shipping Premier, its QuickTime digital movie-editing product. It's an award winner for certain, given its easy visual editing of QuickTime movies. The product has the richness and depth of features to keep the digital filmmaker of the future happy for months. SuperMac Technology, true to its word, has shipped VideoSpigot, the first truly

low-cost video digitizer board, aimed at QuickTime moviemakers.

There were digital film editors from several other companies, including DiVA, Motion Works, and Interactive Solutions. Spectral Innovations and others have video boards in the works that will support full-frame, 30-frames-per-second QuickTime movies—expect to see these shipping by May. We even saw the first collections of QuickTime movies. Our upcoming QuickTime conference in San Francisco (in May) should see hundreds of titles released.

Games Grow Up

THIS YEAR MAY BE REMEMBERED AS the year of QuickTime, but it will always, in my mind, be the year when games for the Mac matured. Reactor's Screaming Metal, thanks to the genius of Bill Appleton, outdates many Sega arcade games. Totally, deliciously, absorbingly cool. Creepy Castle, also from Reactor, will be a hit for the tens of thousands of Dark Castle fans. Mutant Beach from Inline Design also belongs to the group of arcadelike 3-D games that are new for the Mac. Sean Callahan of QuickTime fame has written Inline's Swamp Gas for younger kids. Interplay Productions has a really neat chess game on CD, Battle Chess. The players wander about the board turning into little monsters or realistic royals wrestling with one another for position—no matter that the battle is predetermined. For the chess initiate, this is an absorbing way to learn. Graphic Simulations Corporation showed a World War II Hellcat simulator (Hellcats over the Pacific) that had all of the Expo's middle-aged pilots drooling. Leviathan has yet another color adventure game, Blade. Finally, for the LC and Mac II set, Amtex Software Corporation had a neat little pinball game, Tristan. A very accurate simulation of a real pinball machine.

Education: Switch from GS

ANOTHER APPARENT TREND, AS REPORTED by Mac developers, is education's switch from Apple IIGS purchases to the Mac LC. Apple sold about 560,000 of the formerly slow-selling computers last year, thanks to the LC's growing acceptance by primary and secondary education markets. Dealers, developers, and support people are all feeling the LC's success in areas like utilities, low-end applications, and education (games and courseware), where firms like Great Wave Software are finally receiving a boost in sales that is making it a powerful player in the Mac market.

Educational CDs will continue to drive sales in this market. Broderbund's *continues*

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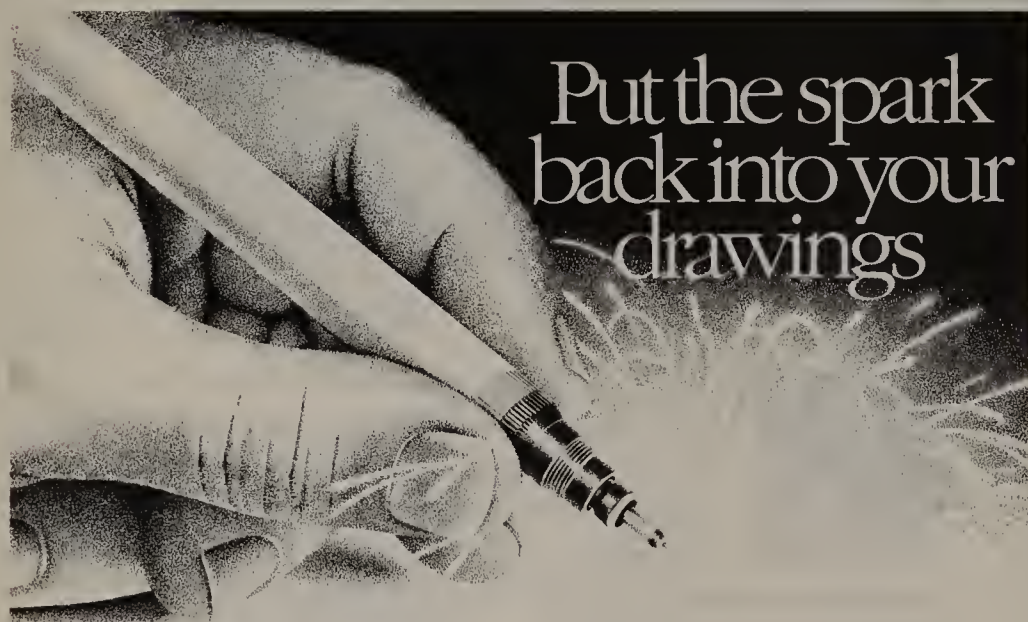
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Living Book CDs, for example, are perhaps a little too cute, but irresistible. Their pleasing music and graphics will make them the learning tools of choice. The Voyager Company has released a host of new CDs that will inevitably sell primarily to educational institutions.

Mapping Geography

GEOGRAPHY SHOWS SIGNS OF BECOMING a fast-growth area. Highlighted Data showed a CD of maps developed from the Department of Commerce's Census Bureau and other data. Within the DOC's Standard Metropolitan Statistical Areas, I was amazed to watch the Mac render maps down to 1-by-2-block areas. GeoQuery Corporation is building more GIS (geographical information system) capability into GeoQuery 3.0 for planners who need to see geographic, economic, and demographic data in a map format.

Overhead Projectors

EVERY SHOW HAS ITS DISPARATE DEMONSTRATIONS of LCD and tube-based large-screen projectors. At last August's Expo, the overhead-projector-based LCD color projectors made real progress; the large tube-based projectors from Sony, Barco, and Electrohome seemed stuck in a rut. The best demos at January's Expo were by nView, In Focus Systems, and Sharp—all showed single-lens LCD projectors that can be driven by analog video, S-video (DIN standard connector), and composite video (RCA jacks) connectors. The winner has to be the new Sharp single-lens projection panel. At about \$6500 for the panel alone, it's the cheapest and may prove to be the brightest.

Graphics

GRAPHICS WAS ONE OF THE LOW-KEY areas of the show, with most new product development focusing on the QuickTime/video area. Still, there were a few gems. I really liked JAG, an antialiasing product from Ray Dream for die-hard Macintosh animation producers who want world-class-quality animation. The guys who brought us Color MacCheese launched another couple of color paint programs; the best is called Zeus. Fractal Design Corporation has reacquired the rights to market ColorStudio from Letraset, and Fractal discussed a new version of Painter (1.2), which should take care of the few shortcomings of the already excellent first version. One exciting and useful trend was obvious at both the Pixar and Specular International booths, where NetRender-Man and BackBurner promise users the ability to farm out complex ray-tracing and other graphics-rendering tasks to

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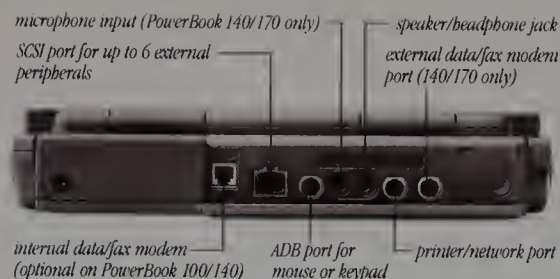
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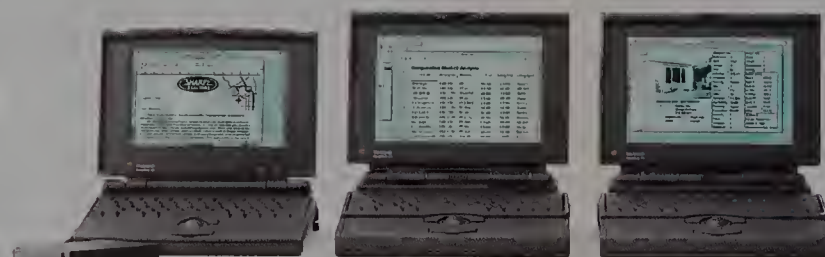
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multiple processors. This has been demonstrated in the past by the folks at Ray Dream. I was actually able to stand at the Specular booth and see three Radius Rockets calculate and render a very complex ray-cast image on the monitor.

And kudos to the Malvern office group of Computer Associates for finally showing new versions of CA-Cricket Draw (III), and CA-Cricket Graph (2.0), which should be out soon.

On the Type Front

ALTSYS'S TIRELESS JIM VON EHR, THE author of FreeHand for Aldus, has version 2.0 of EPS Exchange. Now you can not only export Illustrator to FreeHand (version 1.0), but also convert FreeHand files to Illustrator. Von Ehr has also added a neat calligraphic drawing tool to version 3.5 of Fontographer. Ares Software was demoing the latest in a series of cool type-editing products, this one called AreLiner, that works with Adobe's Multiple Master technology. Agfa Compugraphic Division released another version of its type library on CD, including the largest collection of TrueType faces available.

Japanese Direct Sales

THE MACWORLD EXPO IN SAN FRANCISCO was the show at which a decade-old trend for other computer shows finally reached maturity. For quite a while Radius, RasterOps, E-Machines, and Super-Mac have been packaging monitors from Japanese manufacturers. Beginning two years ago, another group of manufacturers began to repackage lower-cost monochrome monitors to bring prices down; Mirror, Nutmeg Systems, Mobius, and Lapis Technologies are examples. Last year we began to see lower-cost 19-inch monitors enter the Mac market. The presence of Japanese, Taiwanese, and Korean manufacturers at this expo made me realize that they intend to sell direct to U.S. consumers. We're already seeing graphics boards that support multiple monitor standards.

Meanwhile, entire product lines were being demonstrated at the Canon, Sony, and Panasonic booths. These companies should become as visible in this market as NEC over the next six months.

Show Wrap-Up

YOU SHOULD BY NOW HAVE GOTTEN the message that this was one of the best shows ever for the Mac. With the demise of the scheduled New York Macworld Expo and the onset of more specialized (and one hopes more useful) shows like QuickTime: The Conference, 1992 looks like a banner year not seen since 1986 and the Mac II's release. Let's enjoy it. **m**

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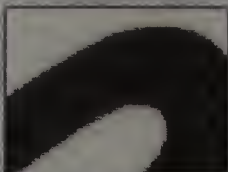


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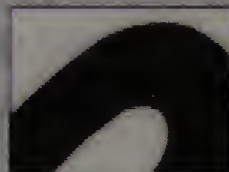
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Just look at the difference in the color scans. The single-pass Silverscanner has three separate noble gas-filled lamps for red, blue and green that are balanced so you get great scans the first time. With Silverscanner's built-in gamma correction, you get clean, bright scans with excellent detail in those hard-to-get areas that don't require difficult adjustment like other scanners. This can mean substantial time savings when every second counts.

The shadow knows.

Do you want good shadow detail? Then compare the black and white scans. The Silverscanner can give you production quality gray-scale scans for magazines, newspapers and brochures.

Lay it on the line.

When comparing line art, the Silverscanner really shines! At 1200 dpi you get what amounts to an *electronic stat*. The comparison is incomplete, however, because some scanners don't have hi-res capability (too bad).

But even if you compare at 400 or 600 dpi, it's clear how much better the Silverscanner is, especially bundled with Color It!

La Cie Silverscanner with Color It

\$1399

of our image.



Microtek 600ZS



\$2,195*

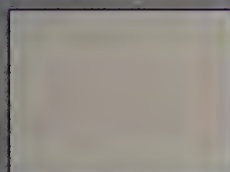
Howtek Scanmaster 3



\$8195**

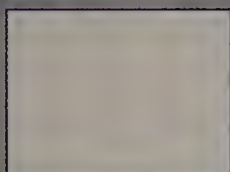
La Cie Silverscanner

\$1,399



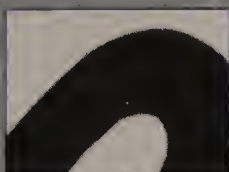
Microtek 600ZS

1200 dpi at 400%—n/a



Howtek Scanmaster 3

1200 dpi at 400%—n/a



La Cie Silverscanner

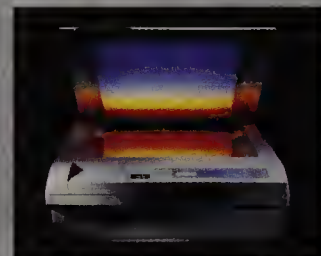
1200 dpi at 400%

All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The logo was scanned as grayscale and as line art. This entire ad was done on the Macintosh using Silverscanner, Photoshop, Quark XPress and a PostScript Imagesetter. The entire production cost was \$145.



La Cie Silverscanner

1200 dpi at 100%



Software to die for!

We're proud of our image when it comes to quality software, too. La Cie has always had a reputation for powerful, well-written software. La Cie's exclusive plug-in modules for Photoshop, ColorStudio, Digital Darkroom, Enhance, ImageStudio and RagTime have been hailed as some of the best software ever written for flat-bed scanners. Enjoy features like fast dynamic *color* previews, independent color/brightness controls, nine scan modes, savable scan settings, color dropout, magnified previews, proof scans, 25% to 400% scaling in 1% steps, and 25 dpi to 1200 dpi in 1 dpi steps.

Silverscanner is OCR and Apple System 7 compatible and can be purchased with full versions of Adobe Photoshop *and* Letraset's ColorStudio—a \$2139 value for only \$1899!

La Cie Silverscanner with
Photoshop and ColorStudio

\$1899

Who ya gonna call?

La Cie offers you toll-free expert technical support. We know scanning inside and out. We can help you. And we'll be here for you tomorrow because La Cie is a Quantum Company.

Seeing is believing.

La Cie is so proud of the Silverscanner, we used it to produce this ad. Not just the comparisons, *everything*. Call and order yours today.

*"The choice is clear . . . buy the La Cie Silverscanner."
Macworld, June 1991*



To order or for more information, call toll-free

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Letters

APRIL 1992

Sinning Saints and Sainly Sinners

YOU APPROPRIATELY OFFER horns to Quark for its quirky QuarkXPress 3.0 (*Conspicuous Consumer*, January 1992). Quark also deserves horns for its outrageous policy of charging for technical support. I have found the answer to most problems by reading the book or by trial and error.

However, one particular time I called technical support, and the specialist refused to even answer my question. A second specialist answered only after taking a credit card number so I could be billed \$25 for the answer. Guess what? It was a case of needing the latest software patch. I was not charged \$25—but then, I haven't received the patch yet either.

*Gene Edwards
Eldersburg, Maryland*

YOU CITE GREAT PLAINS SOFTWARE as deserving a halo "for its policy of a guaranteed one-hour response time to technical-support calls." Great Plains gives its one-hour guarantee only to someone who signs up for its premium tech-support service. With my three modules, premium (one-hour) service for six months would have cost me \$795. For the rest of us proletarian users who are only willing to pay \$90 an hour via credit card for tech support, my few experiences were that calls made in the morning were answered around 7 p.m. that night, or sometime the next day. Furthermore, not one of the answering calls was able to give me decent answers to system problems I was having with the program.

*Larry Hicok
Albany, California*

I AM NOT AWARE OF OPCODE SYSTEMS providing free upgrades to software. I paid \$29 to upgrade my copy of Vision from 1.2 to 1.3, and paid \$129 to

upgrade my copy of Galaxy to Galaxy Plus Editors.

Though I think Opcode makes great products, a liberal upgrade policy has never been one of its strong suits. Furthermore, all of Opcode's applications are copy protected, and we all know how we feel about that.

*Gib Veconi
New York, New York*

You're correct. Although some Opcode updates are free, others are not. Upgrades may cost from \$29 to \$129.—Ed.

MS. BRANSCUM AWARDS HORNS to MacFriends for advertising a drive "with genuine Apple mechanism." She is correct when she states that Apple does not manufacture drive mechanisms (nor has Apple ever done so). However, there is such a beast as an Apple drive. Apple purchases drive mechanisms directly from manufacturers, in some cases installing Apple ROMs on the drives; formats the drives with Apple software; and warrants the drives themselves.

I certainly agree that there are horns and halos to be awarded in the industry. However, this particular award is wide of the mark.

*Mark Hodges
Technical Consultant
MacFriends
Portland, Oregon*

Drawing with the Top

I HAVE USED ALL THE APPLICATIONS mentioned in Deke McClelland's article ("Top Draws," January 1992), with the exception of Michael's Draw. Based on this, I feel it is unfair to put the rest of the field up against the muscle of Aldus FreeHand and Adobe Illustrator—professional applications that I use on a daily basis.

continues

Acer, Acom, Advanced Matrix, Advanced Technologies, Alps

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Mannesmann Talley, Memorex, Mita, Miteck, NCR, NEC, Nissho,

Circle 42 on reader service card

This was not the reason I was disappointed. One of the most powerful applications for illustration seems to have been forgotten. Adobe Photoshop is an extremely versatile illustration tool with a remarkable range of features.

Kelly Gates
Twin Falls, Idaho

The "Top Draws" feature focused on illustration programs, which are designed primarily to create and edit objects composed of lines and shapes, not

bitmaps. Adobe Photoshop and Letraset's ColorStudio are designed primarily for editing bitmaps with tools that resemble drawing tools. All art-related programs have some overlap; we selected programs based on their primary purpose, in this case, creating drawings.—Ed.

IN THE "TOP DRAWS" COMPARISON chart, MacDraw II is listed as not allowing series duplication. You can series duplicate in MacDraw II, but you must duplicate the original by ⌘-D or by

selecting Edit-Duplicate, not by copy and paste. After positioning the first duplicate, just continue with ⌘-D to place each new object in the same position relative to the last one placed.

Jim Schmutz
Lakewood, Colorado

Series duplication means a program has a dialog box in which you can specify the number of duplications, the type of duplication (such as skewed or rotated), and the duplication increments (for example, every 6 points) and then execute the whole series by clicking on the OK button. The approach you describe is a common manual technique used in programs that do not offer true series duplication.—Ed.

CORRECTIONS

In "Seeking Midrange Hard Drives" (February 1992), we listed the incorrect price for Mass Microsystems' 213MB DiamondDrive. The correct price is \$1549.

The correct average sale price for a used Mac IIcx/4MB/80MB was \$2900; the correct average sale price for a used Mac IIci/4MB/80MB was \$3700, which was a \$250 gain in value from the month before (Best-Sellers, February 1992).

Product names for desktop publishing utilities ("Enhancing Page Layout," February 1992) were omitted from Where to Buy. For this information, see Where to Buy under DTP Utilities in this issue.

CMS Enhancements changed the termination of its Platinum 200MB drive from internal to external after "Seeking Midrange Hard Drives" (February 1992) was written but before the issue went to press. Newer CMS drives do not require the dealer to change termination (as the unit sent for our evaluation did).

The PowerModem (News, February 1992) is from PSI Integration.

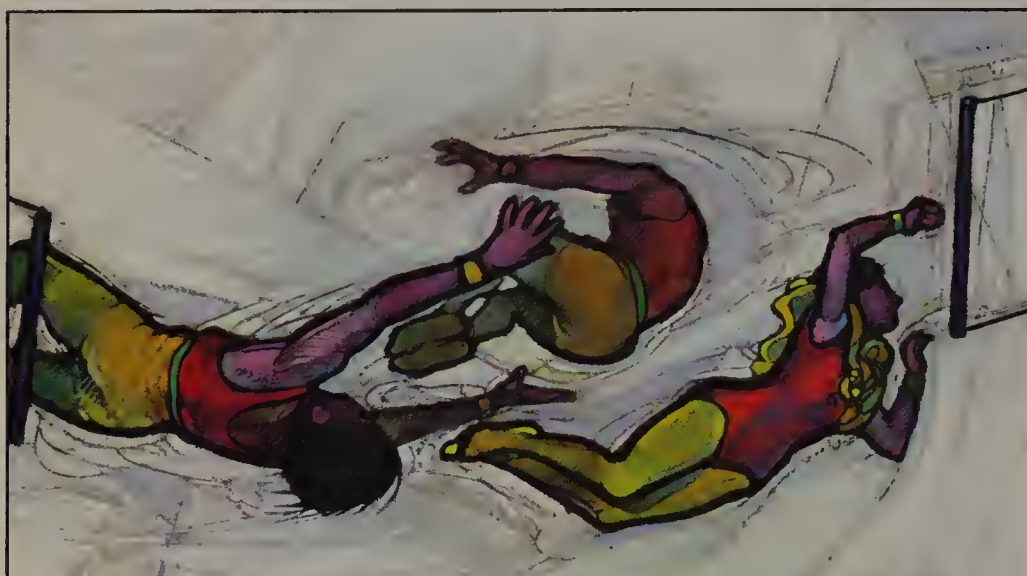
Each hub port of Tutankhamon Electronics' MagicNet supports up to 30 devices (New Products, February 1992).

The correct number of Quadram (New Products, February 1992) is 404/923-6666.

FreeHand does not change the original file when it splits complex paths for outputting EPS files ("Top Draws," January 1992).

The photos for "Color Display Bargains" (March 1992) were all done by Mark Johann.

continues



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ADOBE ILLUSTRATOR WAS NOT the very first program to introduce Bézier curves. When you investigate your archive of programs, you will discover that Challenger Software's Mac3D had Bézier curves over a year before Illustrator even saw its first commercial release, and the curves could be projected onto a plane (thereby given depth) and could be manipulated in three dimensions.

I would like to see recognition where

it is due, even if the product is no longer commercially available.

Paul Velasco
Munster, Indiana

Regulating Legislature

LICENSING OUR LEGISLATORS, my good fellow, presupposes that they are capable of reading, and puts them at an enormous disadvantage to

those more intellectually endowed, like perhaps slugs (*The Iconoclast*, January 1992). Think positive. Imagine the tremendous growth of the licensing industry if every job were to require a license because someone mentioned it to his or her representative. Gone would be the grinding problems of competitiveness and profit.

Darel E. Jenkins
Gig Harbor, Washington

LEVY HIMSELF SUCCUMBS TO statist ideology when he says that government regulations are necessary for some industries, but not for programming. In fact, government regulation has been damaging in other areas, as it will be in software development.

Government controls are doomed to fail because the farther away you are from a particular problem, the less you know about it. The licensing of programmers is wrong because the licensing of anybody is wrong.

Mike Marotta
Lansing, Michigan

MS. KALIK WAS SWEEPED OUT of office in the most recent election along with the rest of the Democrats in the legislature. Unless something happens with this bill in the next few weeks of the lame-duck session, she will not be around to reintroduce it in the next session.

By the way, the bulk of those 10,000 bills and resolutions are the same old bills, reintroduced session after session after session.

Robert Lupp
Ewing, New Jersey

Cheer Up for Christmas

IT STRUCK ME AFTER READING the December 1991 issue that many of your writers must have been dipping into Dickens's *A Christmas Carol* in their free time.

I realize that you wish to be objective, but there definitely seemed to be a Scrooge-like tone to many of the articles—from Jerry Borrell's look at CAD and the Mac (*Commentary*), to Steven Levy's view on the StyleWriter (*The Iconoclast*)—we know it's slow, that's old news—to your views on the Mac Quadras and the PowerBooks.

I know they are not perfect, but I tend to think that the glass is half full rather than half empty.

Thomas Howe
Ottawa, Ontario, Canada

continues

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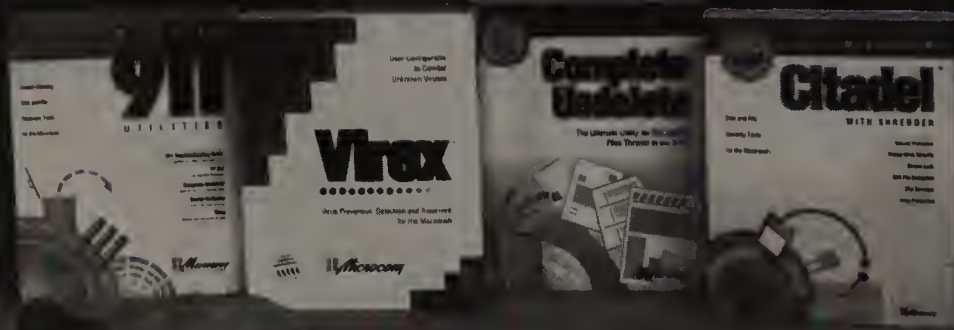
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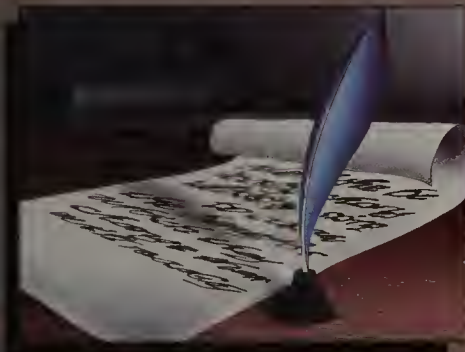
The Evolution of CAD

From the beginning of time, man has tried to express himself through graphics.

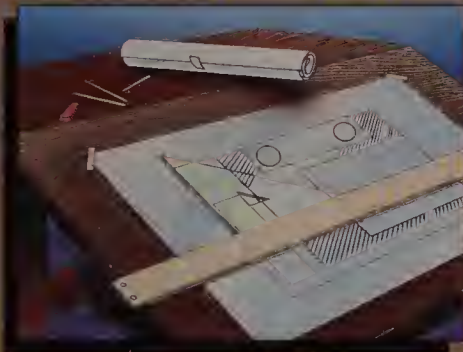
In the beginning man had to use primitive tools for creating graphic designs.



In the 15th Century design tools were quill ink pens and crude styles of paper.



By the 18th Century man had advanced to the drafting table with the T-squares, slide rules, precision ink pens and the dreaded eraser.



In the 20th Century the first CAD programs were very slow and extremely difficult to use, not to mention the expense of buying them.



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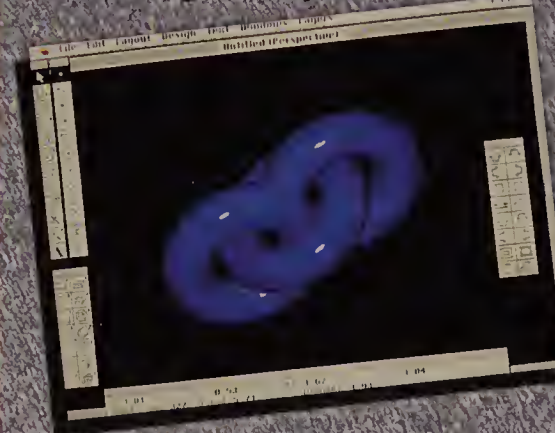
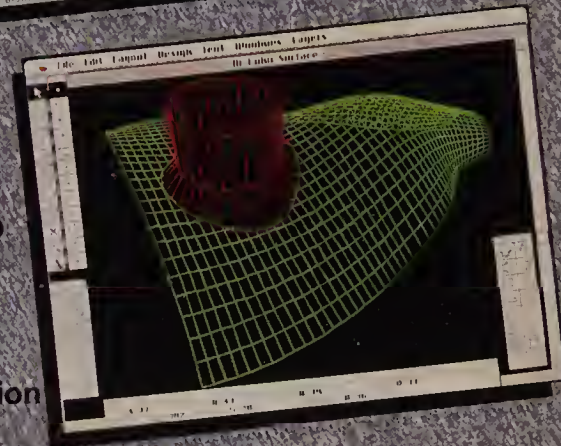
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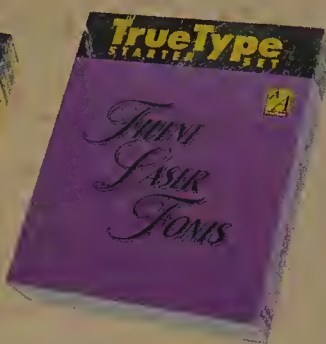
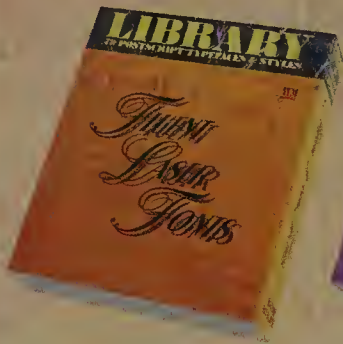


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ELF Effects Repudiated

SEVERAL ARTICLES PUBLISHED IN *Macworld*, including one by Paul Brodeur (July 1990), claim that the electromagnetic fields from VDTs may have significant health effects. These articles have focused on selected literature reports that present evidence for effects such as adverse pregnancy outcomes in female workers using VDTs. Little or no mention was made in the *Macworld* articles of numerous studies conducted in Europe, Canada, and the United States that failed to find a significant association between job-related VDT usage and adverse pregnancy outcomes.

IEEE's Committee on Man and Radiation (COMAR) Entity Position Statement entitled "Biological Effects of Electric and Magnetic Fields from Video Display Terminals" was issued in 1990, and concluded that there appear to be no consistent health effects associated with exposure to fields from VDTs. This report and a detailed critique of Paul Brodeur's book *Currents of Death* are obtainable by writing to IEEE, 1828 L St. NW, #1202, Washington, DC 20036-5104.

James C. Lin
Chairman, COMAR
Chicago, Illinois

Our articles have only in passing mentioned electromagnetic fields' negative effects on pregnancy, and rather have focused more on immunodeficiency syndrome, leukemia, and other possible long-term effects of exposure to electromagnetic radiation on both sexes. *The American Journal of Epidemiology* (August 15, 1991) published the paper "Occupational Exposure to Electromagnetic Fields and Breast Cancer in Men," the results of which, according to the journal, "lend support to the theory that electromagnetic fields may be related to breast cancer in men."—Ed.


Training Cheaply

READ THE DECEMBER 1991 REVIEW of training materials with enthusiasm (*The Desktop Critic*). I suspect I am in the mainstream in considering price a close second to quality, and in preferring to allocate my limited resources to equipment and software. No matter how good the production quality is, who is going to pay \$475 for two hours of canned training from Mac MBA?

I'll pass along a couple of my discoveries: Heizer Software tutorial disks on Excel, Works, and HyperCard (Heizer Software, P.O. Box 232019, Pleasant Hill, CA 94523; 415/943-7667) and rentals of

continues

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Russ Higgins
Newton, Massachusetts

Woz Oversight

I CAME ACROSS CHIA-TEH WU'S Letter stating "If anyone is to be credited for the PC/digital revolution, it should be Steve Jobs," citing his invention of the Apple II and Macintosh (*Letters*, December 1991). I would like to remind your readers that Steve Wozniak as well as Steve Jobs developed the original Apple personal computer. I'm sure Mr. Wozniak did not appreciate being left out.

Keith Paolino
Providence, Rhode Island

Illusory Retina

YOUR ART AND DESIGN DIRECTORS are to be commended for their consistently excellent and unique methods of envisioning information. However, I have noticed a technical

error in the representation "The Illusion of Color" ("24-Bit Monitors: Fast and Functional," January 1992).

The otherwise beautiful illustration depicts a beam of light shining from the surface of a monitor screen to the back of an eyeball. The circled area on the left, where the light is shining, is incorrectly labeled as the retina. That circled area is the optic nerve head—also known as the eye's blind spot.

Sandy Bury
Oak Lawn, Illinois

Index Hunt

IT IS A GREAT DISAPPOINTMENT when I find you have eliminated the annual index from your publication. I have saved all the issues I have received for this purpose, and I now have two years' worth of unindexed issues. Is it possible to obtain indexes for 1990 and 1991?

Timothy Westman
Woodsville, New Hampshire

The 1991 annual index ran in our February 1992 issue. To receive *Macworld's* 1990 index by mail, send a self-addressed, legal-size envelope with 75 cents postage to 1990 Index, *Macworld*, 501 Second St., San Francisco, CA 94107.

Printer Power Problem

MY APPLE LASERWRITER printer is too loud and uses too much electricity to run 24 hours a day. Since I sometimes go days without printing, the solution was obvious—turn it off unless I need it. That would be fine, except the power switch is all the way in back—in the farthest corner, where I can't reach it without getting up and moving the desk away from the wall. So now I have to spend another hunk of change to buy a multiswitch surge protector so I can turn the printer off.

Doesn't Apple ever take the time to check out how people use their machines in real life?

David Binnion
Hillsboro, Ohio

Letters should be mailed to *Letters*, *Macworld*, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include a return address and a daytime telephone number. We regret that, due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. **m**

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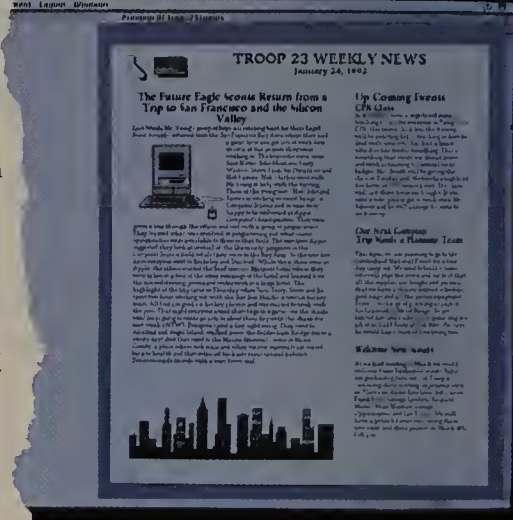
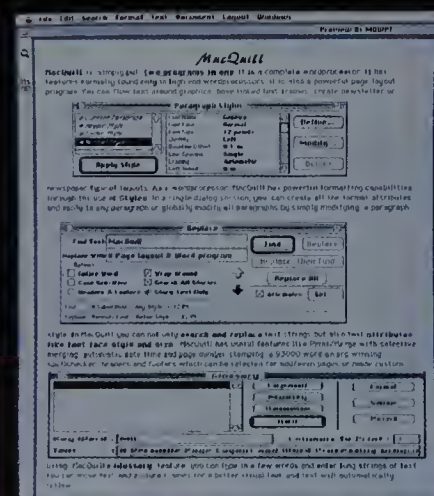
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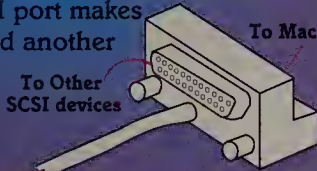
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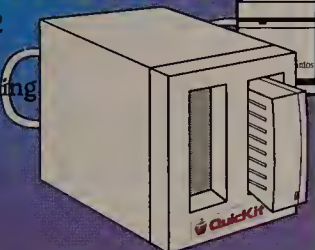
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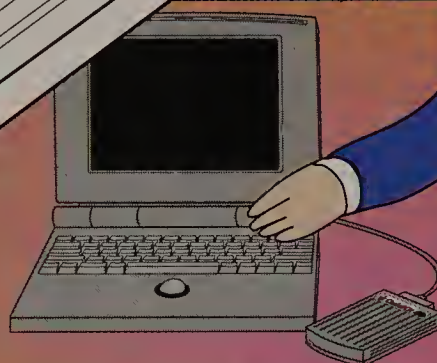
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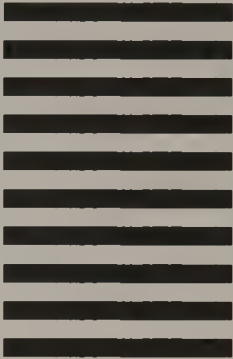
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Art Beat

Behind Macworld's Graphics

BY CATHY ABES

Artist: Jim Ludtke is a San Francisco-based illustrator and 3-D animator whose complex and striking 3-D images have often appeared in *Macworld*.

Hardware: Macintosh IIx with 32MB of RAM and a 50MHz Daystar Digital Accelerator, 300MB MicroNet external hard drive, MicroNet 45MB removable-cartridge drive.

Software: Adobe Illustrator 3.0, FontMonger, Swivel-izer, Swivel 3D Professional, Sculpt 3D, ElectricImage Animation System, Adobe Photoshop 2.0.

How It Was Done:

For the illustration that opens our feature on System 7, Ludtke began, in Illustrator, by drawing the outlines of the machinery framework. He used this Illustrator file first as a grid on which to plan and sketch the various machine parts in the model. Next he converted the Illustrator outlines into a Swivel 3D Professional file. He began this three-step process by importing the outlines into Ares Software's FontMonger, a font-customizing program that lets you alter the attributes of any existing font character or replace it with one you've designed. Clicking on any of the keys on FontMonger's on-screen keyboard while pressing ⌘-I brings up the Import dialog box. Then you save the design to create a new PostScript Type 1 font family and suitcase screen font.

Once the design exists as a font character, you can easily import it into any 3-D modeling package that supports 3-D text. Ludtke used MacroMind/Paracomp's Swivel-izer, a 3-D conversion util-

ity, to import the document into Swivel 3D Professional because it saves 3-D files in Swivel format. (He used the same process to create the fan belts and the gears.) Creating these objects in Illustrator (which allows you to easily create precise shapes and curves) and importing them through FontMonger and Swivel-izer into Swivel 3D provided Ludtke a quick and easy way to create numerous 3-D models and import them into one Swivel file.

Once in Swivel-izer, Ludtke used the Open Font command (under the File menu) to locate the font he'd created in FontMonger, then he typed the characters that represented his previously saved designs and pressed return to open the outlines so that he could save them in Swivel format.

Next Ludtke opened the new file in Swivel, where he extruded the front and back support beams of the structure. Then he created a cube as a base for the beams to stand on, duplicating

each object and placing the duplicates parallel to the originals to create the four legs of the structure. After adding platforms and railings to the construction, he began modeling the machine parts that would go inside them. He created the coiled spring behind the clock in Byte by Byte's Sculpt 3D by using the Twist command on a circle.

From Swivel, Ludtke exported a side view of the frame structure, saved it as a PICT file to the Scrapbook, and then pasted it into the background of each Swivel file for each level. He used this as

continues



The final 3-D image as it appears in the feature "Taking Stock of System 7."

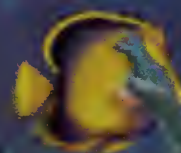
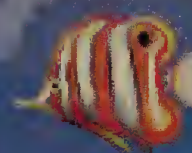
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a template: he placed objects on top of it to make sure all the machine parts would fit as closely as possible when he combined them within the frame. Ludtke created three separate Swivel files for the machine parts on each of the three levels of the structure. Because each file was between 200K and 400K (as opposed to 1068K if they had been combined as one), they required less memory to open and less time to redraw on screen.

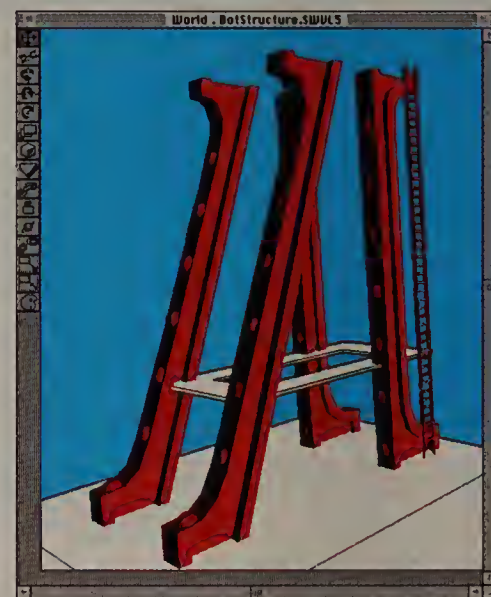
To create the curved pipe shape that he used in some of the machine parts, Ludtke extruded a circle to create a very thin disk, duplicated the disk, and rotated it a few degrees on its *x* axis. Then with the Lock tool he linked the duplicate to the original disk. After selecting the second disk, he used the Duplicate Link command to create several more disks, each one rotated the same amount as the previous one, until he'd created a 90-degree bend. Then he selected the first disk and used the Create Skin Object command to create a solid object based on the shape created by the disks.

Once he had completed all the machine parts in each level, Ludtke opened all the files that contained the various machine parts, copied and pasted them into the original Swivel file containing the base and structure, positioned them, and saved the file. Then he created another Swivel file—a room containing a floor and

two walls. After drawing the larger wall by clicking on four points, he clicked and dragged numerous points to create the shape of a numeral 7 as if it were cut out of the wall, and then extruded the wall. He imported the Swivel file containing the frame structure into ElectricImage using ElectricImage's Transporter utility



The font character was imported into Swivel-izer and saved as a Swivel file.



In Swivel, the four-legged structure was created by extruding and duplicating the two original legs.



The outlines of the frame drawn in Illustrator.



The outlines in FontMonger being transformed into a font character.



The series of linked disks created in Swivel and the solid pipe shape made from them with the Create Skin Object command.



The reflection map created in Photoshop was applied to the pistons in ElectricImage.



This texture map, also created in Photoshop, was tiled in ElectricImage to cover more surface, and was applied to the floor as both a surface map and a bump map for an upraised effect.

and saved the file in ElectricImage's FACT format. Next he imported the room object into the new ElectricImage file and positioned it behind and underneath the structure.

ElectricImage has a camera that you move around to change the viewer's perspective for rendering the scene. After setting the camera's lens to a wide angle to give the scene an appearance of spaciousness, Ludtke placed eight or nine white radial lights, with a 15-foot drop-off, at various locations. He placed a blue radial light, with a 30-foot drop-off, outside the hole in the wall to give the illusion of natural light streaming in from outdoors.

In Photoshop, Ludtke created the texture maps and reflection maps for the machines, the floor, and the walls. He drew the circuit board pattern for the floor in Illustrator and imported it into Photoshop, where he could convert it to ElectricImage's Image file format so that he could open it in ElectricImage. He applied pattern to the floor as both a surface map and a bump map to make the patterns appear to be embossed.

After rendering the entire scene, Ludtke imported it into Photoshop, where he added the sky image to the hole in the wall. **m**



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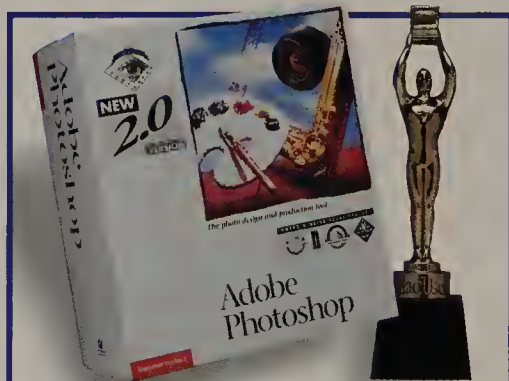
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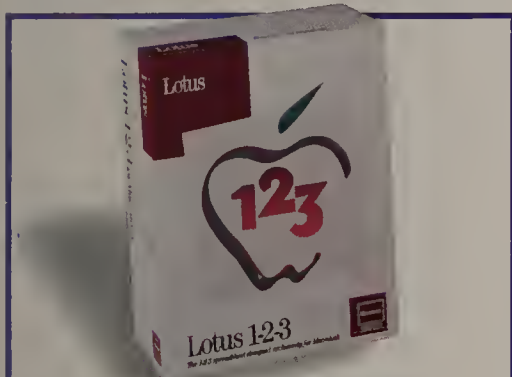
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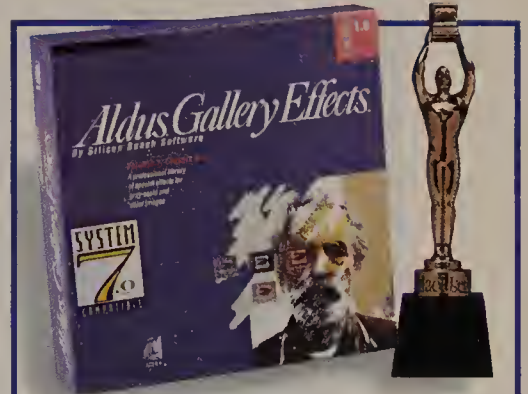
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- 2237 **GreatWorks** . 199. 2278 Upgrade . 99.
- 3422 **More 3.1** 265.
- ★ **Symmetry** ... 30 day MBG
- 3131 **Acta 7 1.0** 75.
- ★ **Synergy** ... 30 day MBG
- 6617 **KaleidaGraph 2.1.3** 150.
- ★ **Teleware** ... 30 day MBG
- 7616 **M.Y.O.B. 2.1** 138.
- ★ **TIMESLIPS** ... 30 day MBG
- 2986 **Timeslips III 2.1** 194.
- ★ **T/Maker** ... 30 day MBG
- 3639 **WriteNow 3.0 (Mar. '92)** 155.
- 3508 **The PowerBundle (with carry case)** . . 159.
- ★ **Williams & Macias** ... 30 day MBG
- 4976 **StickyBusiness 1.5** 51.
- 6926 **myDiskLabeler III 3.1** 42.
- ★ **WordPerfect** ... 60 day MBG
- 3800 **WordPerfect Mac 2.0.3** 295.
- 3090 **WordPerfect Office 3.0 (single)** 89.
- 3092 **WP Office (5 pack) 295. 3088 (20 pack) 895.**
- ★ **Wordstar** ... 30 day MBG
- 3554 **American Heritage Dictionary** 55.
- 6984 **Correct Grammar 3.0** 55.
- ★ **Wyoming Software** ... 30 day MBG
- 3555 **Business Sense 1.5** 124.

GRAPHICS & DESIGN PUBLISHING, PRESENTATIONS

- ★ **Abracadata, Ltd.** ... 30 day MBG
- 9995 **Instant Decorator 1.1** 29.
- 9990 **Design Your Home - Architecture, 9992 Interiors, or 9994 Landscape** . . ea. 63.
- Adobe Systems**
- 8794 **Adobe Type Library (Vol. 1-250)** call
- 6957 **Adobe Type On Call** 47.
- 5750 **Adobe Type Reunion 1.0.2** 41.
- 6053 **Adobe Type Manager 2.0** 59.
- 6156 **Adobe Plus Pack 2.0** 118.
- 6098 **Adobe Plus Pack/ATM** 174.
- TypeAlign for ATM 1.0.4** 62.



★ Aldus ... 30 day MBG

2461 **Aldus Gallery Effects 1.0**—1991 MacUser Editors' Choice Award for *Best Visual Resource*. Transforms images into works of art. Whether scanned or original art, you can apply professional-looking effects easily & in minutes \$128.

- 5001 **Streamline 2.0** 122.
- 4145 **Adobe Premiere 1.0** 305.
- 8171 **Adobe Illustrator 3.2 (with ATM)** 368.
- 6644 **Adobe Photoshop 2.0** 548.
- 6671 **Adobe Type Set 1 or 6677 Type Set 2** 62.
- 7587 **Adobe Type Set 3** 125.
- Adobe Type Sets for Business:*
- 2221 **Letters, Memos & Faxes** 95.
- 2223 **Invitations & Awards** 95.
- 2219 **Spreadsheets & Graphs** 95.
- 2222 **Overheads & Slides** 95.
- ★ **Aldus** ... 30 day MBG
- 6674 **Aldus Personal Press 1.01** 109.
- 2461 **Aldus Gallery Effects 1.0** 128.
- 3506 **Aldus SuperPaint 3.0** 132.
- 3980 **Aldus Digital Darkroom 2.0** 259.
- 3507 **Aldus Super 3D 2.5** 325.
- 7467 **Aldus PrePrint 1.51** 325.
- 4751 **Aldus Persuasion 2.1** 325.
- 1330 **Aldus FreeHand 3.1** 394.
- 7088 **Aldus PageMaker 4.2** 494.



★ Abracadata, Ltd. ... 30 day MBG

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Altsys

- 9806 **Metamorphosis Pro 2.03** 89.
- 1983 **EPS Exchange 2.0** 89.
- 1195 **Fontographer 3.5 (Feb. '92)** 262.
- ★ **Ares Software** . . . 30 day MBG
- 8878 **FontMonger 1.05** 62.
- ★ **Baseline Publishing** . . . 30 day MBG
- 8055 **Screenshot 1.2** 34.
- Bitstream**
- 9428 **True Type Fonts 1 or 9429 Fonts 2** . ea. 59.
- 1591 **True Type Fonts 3 or 1595 Fonts 4** . ea. 98.
- Broderbund Software**
- 3572 **Kid Pix 1.2** 34.
- 1427 **The Print Shop 1.3.2** 35.
- 6281 **TypeStyler 2.0 (with ATM)** 126.
- ★ **Casady & Greene** . . . 30 day MBG
- 8879 **Fluent Font Library 4.05** 99.
- 1945 **True Type Starter Set** 57.
- ★ **Claris** . . . 30 day MBG
- 1123 **MacPaint 2.0** 86.
- 2518 **MacDraw Pro 1.01** 275.
- 8007 **Claris CAD 2.0** 625.
- Custom Applications**
- 8037 **Freedom of Press Light 3.01 (17 fonts)** . 55.
- ★ **DeltaPoint** . . . 60 day MBG
- 3558 **DeltaGraph Pro** 205.
- ★ **Deneba Software** . . . 30 day MBG
- 3227 **Canvas 3.0** 248.



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1608 **More Disk Space**—Invisibly double the capacity of your hard drive with a single click of the mouse \$55.

2687 **SuperDisk!**—Selectively compress individual files, folders, & volumes on-the-fly. . 49.

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- 4870 **Expert Color Paint 1.0** \$29.
- ★ **Foundation Publishing** . . . 60 day MBG
- 6728 **Comic Strip Factory 1.6** 36.
- IDD/Innovative Data Design**
- 2417 **MacDraft 2.1** 279.
- 4707 **Dreams 1.10** special 349.
- ★ **Letraset** . . . 30 day MBG
- 2619 **ImageStudio 1.5** 139.
- 4709 **LetraStudio 2.0 (Mar. '92)** 139.
- 6300 **FontStudio 2.0** 359.
- 6301 **ColorStudio 1.5** 599.
- FONTEK Typeface Collection** ea. 30.
- ★ **Lingulst's Software** . . . 60 day MBG
- Over 100 language fonts** call
- 2638 **LaserCyrillic 1.0** 99.
- ★ **MacroMind•Paracomp** . . . 30 day MBG
- 3440 **QuickPICS 1.0** 103.
- 3148 **Magic 1.0** 275.
- 5028 **ModelShop II 2.0** 619.
- SwivelArt (Map & Viewpoint art)** . . ea. 175.
- 7441 **Swivel 3D Professional 2.0** 479.
- 3450 **SwivelMan 1.0** 619.
- ★ **Mainstay** . . . 30 day MBG
- 9798 **Capture 4.0** 82.
- ★ **MicroFrontier** . . . 30 day MBG
- 3013 **Color It! 1.0** 73.

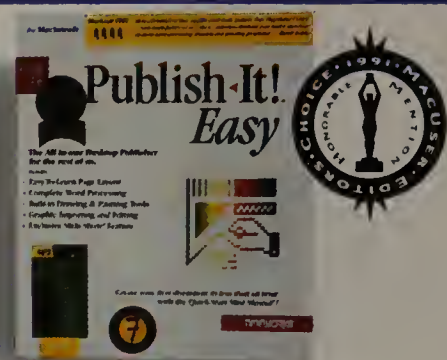


★ Virtus Corporation . . . 30 day MBG

4488 **WalkThrough 1.03**—Award-winning 3D drawing program with real-time 3D presentations, QuickTime and PICS animation movies, and perspective pictures as well as data exchange capabilities \$249.

★ MicroMaps . . . 30 day MBG

- 7556 **MapArt (PICT) or 7555 (EPS)** ea. 89.
- ★ **Microsoft** . . . 30 day MBG
- 2878 **PowerPoint 2.01E** 245.
- ★ **Monotype Typography** . . . 30 day MBG
- Monotype Imprints-TrueType** ea. 22.
- Classic Fonts (full line available)** call
- Postcraft International**
- 2210 **Effects Specialist 1.04** 89.
- Layouts for PageMaker, ReadySetGo, & QuarkXPress** ea. 69.
- Quark**
- 7612 **QuarkXPress 3.1** 569.
- ★ **Specular International** . . . 30 day MBG
- 4962 **Infini-D 1.1** 647.
- ★ **Splnnaker** . . . 30 day MBG
- 3530 **Certificate Maker 2.02** 22.
- Strata**
- 7773 **Stratavision 3D 2.0** 629.
- ★ **SuperMac Technology** . . . 60 day MBG
- 3380 **PixelPaint 2.1** . 149. 5625 **Pro.** 459.
- ★ **Symmetry** . . . 30 day MBG
- 8172 **Mariah 1.0** 93.
- 3G Graphics**
- 3942 **Images with Impact: Graphics 1** 49.
- 6379 **Accents & Borders I** 63.
- 4583 **Business 1** . 63. 2003 **People 1** . 94.



★ Timeworks . . . 30 day MBG

7115 **Publish It! Easy 2.1 with File-It!**—Honorable Mention—1991 MacUser Editors' Choice Award for Best Integrated Application. All-in-one desktop publisher combines ease of use with advanced features that make page layout a breeze. . \$145.

★ Timeworks . . . 30 day MBG

- 7115 **Publish It! Easy 2.1 with File-It!** 145.
- ★ **T/Maker** . . . 30 day MBG
- ClickArt (7 bitmapped)** ea. 32.
- ClickArt (5 EPS formats)** ea. 82.
- 1858 **ClickArt for Faxes** 45.
- 1292 **Color Graphics Presentation 1.0** 109.
- ★ **Virtus Corporation** . . . 30 day MBG
- 4488 **WalkThrough 1.03** 249.
- ★ **Visual Business Sys.** . . . 30 day MBG
- 9867 **GraphMaster 1.3** 189.

PROGRAMMING

UTILITIES, HYPERCARD, SECURITY

★ Abbott Systems . . . 30 day MBG

- 2515 **Calc+ 1.0** 39.
- 5236 **CanOpener 2.0** 62.
- ★ **Advanced Software** . . . 30 day MBG
- 8051 **Intouch 1.1** 39. 9986 **Network (3-Pak)** 112.
- 2808 **QuickTools 1.01** 45.
- After Hours Software**
- 1352 **TouchBASE 2.0** 78.
- ★ **Aladdin Systems** . . . 30 day MBG
- 6169 **Shortcut 1.5** 45.
- 6740 **StuffIt Deluxe 3.0 (Mar. '92)** 59.
- ★ **Aldus** . . . 30 day MBG
- 5100 **Aldus SuperCard 1.6** 195.
- ★ **ALSoft** . . . 30 day MBG
- 9808 **MasterJuggler 1.57** 25.
- 9807 **DiskExpress II 2.10** 49.
- 5204 **ALSoft Power Utilities 1.0** 69.
- ★ **Alysis Software** . . . 30 day MBG
- 2687 **SuperDisk!** 49.
- 1608 **More Disk Space** 55.
- Apple Computer**
- 1074 **System 7 (with free PCTV video)** 99.
- ★ **ASD Software** . . . 30 day MBG
- 7085 **FileGuard 2.7 (1 user)** 138.
- 7422 **(5 user)** . 479. 7423 **(10 user)** . 799.
- 5313 **Active Memory 2.0 (1 user) (Feb. '92)** . 125.
- 5314 **(5 user)** . 315. 5315 **(10 user)** . 625.
- ★ **Baseline Publishing** . . . 30 day MBG
- 7783 **INIT Manager 1.1** 33.
- 3114 **INIT Info Pro** 39.
- ★ **Berkeley Systems** . . . 30 day MBG
- 5737 **After Dark 2.0V** 28.
- 2198 **More After Dark (M.A.D.)** 23.
- 2196 **After Dark & M.A.D. Bundle** 40.
- 1541 **Stepping Out II 2.02** 49.
- Bright Star Technology**
- 2614 **At Your Service 1.0** 29.
- 3994 **Catalog of Actors (six)** 55.

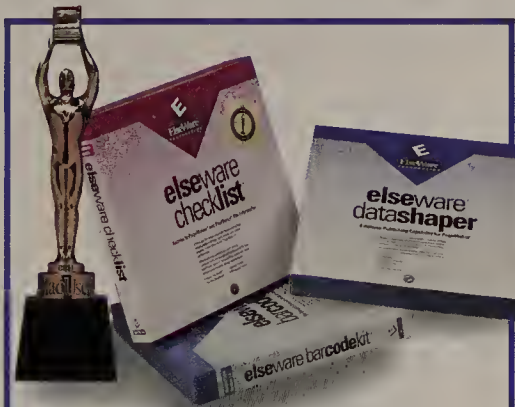
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★ **Casa Blanca Works ... 30 day MBG**
 1593 ⑦ **Drive 7 2.0**—The most versatile & affordable formatter available. Incls. Drive7Rem for Syquest, Bernoulli, Optical, & CD-ROMs! \$51.
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 1593 ⑦ **Drive 7 2.0**..... 51.
 1573 ⑦ **DriveShare**..... 89.
- ★ **Casady & Greene ... 30 day MBG**
 2269 ⑦ **QuickDEX 2.3** .. 22. 2528 (5 Pak) .. 99.
 4485 ⑦ **Crash Barrier 1.0**..... 45.
- ★ **CE Software ... 60 day MBG**
 1727 ⑦ **CalendarMaker 3.0.1**..... 31.
 6278 ⑦ **DiskTop 4.01** or 3376 ⑦ **Tiles 1.0** .. ea. 63.
 7518 ⑦ **Alarming Events 1.03**..... 84.
 8024 ⑦ **QuickKeys² 2.1**..... 93.
 1565 ⑦ **QuickKeys² (10 user)** 749. 1561 (50) 2799.
- ★ **Central Point ... 30 day MBG**
 5041 ⑦ **Mac Tools Deluxe 1.2**..... 79.
- ★ **Clarls ... 30 day MBG**
 8734 ⑦ **HyperCard Development Kit 2.1**..... 139.
- ★ **Connectix ... 30 day MBG**
 7830 ⑦ **Maxima 2.0.1**..... 45.
 6647 ⑦ **HandOff II 2.2.1**..... 55.
- ★ **Cyan ... 30 day MBG**
 2715 ⑦ **Peacock 2.0 (for HyperCard)**..... 43.
- ★ **Dantz Development ... 30 day MBG**
 3393 ⑦ **DiskFit Pro 1.0**..... 74.
 5255 ⑦ **Retrospect 1.3A**..... 147.
 7945 ⑦ **Retrospect Remote 1.3**..... 264.
 7946 ⑦ **Remote (10 Pak)** 147. 3112 (50 Pak) 649.
- Dubi-Click Software**
 6653 ⑦ **MenuFonts 4.0**..... 44.
 7974 ⑦ **ClickChange 1.05.2**..... 56.
 1824 ⑦ **Calculator Construction Kit 2.09.6**..... 62.
- ★ **ElseWare Corp. ... 30 day MBG**
 4871 ⑦ **Checklist 2.0**..... 89.
 1507 ⑦ **Bar Code Kit** or 1506 ⑦ **DataShaper** ea. 135.
- ★ **Fifth Generation ... 30 day MBG**
 4287 ⑦ **PYRO! 4.01**..... 27.
 3955 ⑦ **Suitcase II 2.0**..... 53.
 8286 ⑦ **SuperLaserSpool 2.02**..... 99.
 5178 ⑦ **FastBack Plus** or 5725 ⑦ **DiskLock** ea. 127.
- ★ **FWB, Inc. ... 30 day MBG**
 2999 ⑦ **Hard Disk Toolkit 1.0**..... 125.
- ★ **HandOff Corporation ... 30 day MBG**
 1340 ⑦ **TrashMaster 1.0**..... 39.
- ★ **ICOM Simulations ... 30 day MBG**
 3731 ⑦ **OnCue II 2.0**..... 56.
- ★ **Insight Development ... 30 day MBG**
 6171 ⑦ **MacPrint 1.3**..... 92.

- ★ **JAM Software USA ... 30 day MBG**
 6089 ⑦ **Smart Alarms** with Appt. Diary 3.0.7 .. \$63.
- ★ **Kensington ... 30 day MBG**
 9301 ⑦ **PassProof (right)** or 9300 (left) ea. 65.
 2011 ⑦ **PassProof Classic** or 1632 IIsi ea. 65.
- ★ **Kent Marsh Ltd. ... 30 day MBG**
 9513 ⑦ **FolderBolt 1.02**..... 73.
 1839 ⑦ **The NightWatch II (Feb. '92)**..... 89.
- ★ **Kiwi Software ... 60 day MBG**
 6267 ⑦ **KiwiENVELOPES! 3.1.5**..... 32.
 3518 ⑦ **Kiwi POWER WINDOWS**..... 50.
- ★ **Magic Software ... 30 day MBG**
 7267 ⑦ **AutoSave II** or 7268 ⑦ **POWERicons** ea. 26.
 7270 ⑦ **Backmatic 2.01**..... 50.
- ★ **Microcom ... 30 day MBG**
 8562 ⑦ **Complete Undelete 1.1**..... 48.
 4803 ⑦ **Virex 3.5**..... 57.
 8561 ⑦ **911 Utilities** or 2462 ⑦ **Citadel w/Shredder** 89.
- MicroMat Computer Systems**
 2810 ⑦ **MacEKG 1.0.9**..... 63.
- ★ **Microseeds Pub. ... 60 day MBG**
 7068 ⑦ **INITPicker 2.02**..... 34.
 2913 ⑦ **Redux 1.63** or 7116 ⑦ **Rival 1.1.8** .. ea. 49.
 2936 ⑦ **HAM (removes fat from Apple menu)** .. 49.
- ★ **Microsoft ... 30 day MBG**
 4471 ⑦ **QuickBasic 1.0**..... 64.



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 4871 ⑦ **Checklist 2.0**—1991 MacUser Editors' Choice Award for Best Prepress Product \$89.
 1506 ⑦ **DataShaper 1.2**..... 135.
 1507 ⑦ **Bar Code Kit 1.0d**..... 135.

- ★ **Nine to Five Software ... 30 day MBG**
 9767 ⑦ **Reports 2.1**..... 94.
- ★ **Now Software ... 30 day MBG**
 1793 ⑦ **Now Up-To-Date 1.0**..... 65.
 6925 ⑦ **Now Utilities 3.1**..... 83.
- ★ **ON Technology ... 1 year MBG**
 6385 ⑦ **On Location 2.0**..... 75.
 9801 ⑦ **Meeting Maker (5)** . 309. 9800 (10) . 549.
 2570 ⑦ **Instant Update (2)** .. 309. 2571 (5) .. 619.
 1566 ⑦ **STATUS•Mac 2.0.2 (unlimited)**..... 749.
- ★ **Palomar Software ... 30 day MBG**
 8210 ⑦ **PLOTTERgeist 2.0**..... 249.
- ★ **Sallent Software ... 30 day MBG**
 7404 ⑦ **DiskDoubler 3.7**..... 45.
 4838 ⑦ **AutoDoubler 1.0**..... 45.
- ★ **Symantec ... 30 day MBG**
 5176 ⑦ **Symantec AntiVirus for Mac (SAM)** 64.
 5724 ⑦ **Symantec Utilities for Mac (SUM II)** 96.
 6748 ⑦ **Norton Utilities for the Mac 1.1**..... 79.
 3598 ⑦ **Norton Utilities & SAM Bundle**..... 118.



MicroMat Computer Systems
 2810 ⑦ **MacEKG 1.0.9**—Detect software & hardware problems BEFORE they occur. This new diagnostic measures every performance indicator giving you a virtual "dashboard" for your Mac. Digital voice announces test results \$63.

- 3421 ⑦ **THINK Pascal** 165. 2688 ⑦ **THINK C** 199.
 9957 ⑦ **THINK Reference 1.0**..... 64.
- Teknosys**
 5203 ⑦ **HELP! 1.0.1**..... 89.
- ★ **TGS Systems ... 60 day MBG**
 6667 ⑦ **Prograph 2.5**..... 309.
- ★ **Thought I Could ... 30 day MBG**
 4843 ⑦ **Wallpaper 1.0.1**..... 37.
- ★ **Visionary Software ... 30 day MBG**
 3888 ⑦ **Synchronicity 3.0**..... 35.
 3887 ⑦ **First Things First 2.0**..... 41.
- ★ **Wolfram Research ... 30 day MBG**
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 1423 ⑦ **Hard Ball II** or 8217 **Ishido** ea. 31.
 8220 ⑦ **Jack Nicklaus Golf**..... 34.



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 1340 ⑦ **TrashMaster 1.0**—Keep precious disk space free & precious data from falling into the wrong hands. Automated trash emptying & file erasing per US DOD spec. Selective emptying via menu. Completely user-configurable . \$39.

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- 3503 7 Dark Castle 1.1. \$34.
- 3502 7 Beyond Dark Castle 1.0 34.
- ★ **Baseline Publishing ... 30 day MBG**
- 7785 7 Talking Moose 4.0.2 22.
- ★ **Beacon Technology ... 30 day MBG**
- 4967 7 HyperBible (KJV) or 4968 (NIV) . . ea. 125.
- Broderbund Software**
- 4314 7 Type! 1.0. 18.
- 6516 7 The Playroom 2.0 (CP) (color) 29.
- 6384 7 Carmen Sandiego Series (CP) ea. 29.
- 5317 7 PlayMaker Football (color) (Feb. '92) . . 29.
- 9804 7 Spelunx and the Caves of Mr. Suedo . . 29.
- 3559 7 RoboSport or 8195 7 BannerMania . . . 35.
- 3562 7 SimAnt or 5318 7 Nigel's World 35.
- 8266 7 Patton Strikes Back. 35.
- 4966 7 SimEarth 1.1. 40.
- 4966 SimCity (CP) . . . 29. 5871 7 Supreme. . . 47.
- ★ **Carina Software ... 30 day MBG**
- 5726 7 Voyager 1.2 87.
- ★ **Casady & Greene ... 30 day MBG**
- 4119 7 Crystal Quest with Critter Editor 2.2x. . . 29.
- 7495 7 Mission Starlight or 7498 7 Sky Shadow . 29.
- 3343 7 Aqua Bopper Piper or 3342 7 Glider. . . 29.
- 4960 7 Fun Bundle (includes Crystal Quest w/CE, Sky Shadow & Mission Starlight). 59.
- ★ **Centron Software ... 30 day MBG**
- 2707 7 Puzzle Master. 26.
- 8525 7 Casino Master (B&W) 41. 8524 (Color) 45.



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4870 7 **Expert Color Paint 1.0**—New! The latest in painting tools at an incredible price. You get hot 32-bit color, image editing, and tools that may be customized, anti-aliasing, virtual memory and System 7 support \$29.

- ★ **Davidson & Associates ... 30 day MBG**
- 3922 7 Talking Spell It Plus. 29.
- 6128 7 MathBlaster Mystery. 28.
- 2574 7 MathBlaster Plus 34.
- 8278 7 Alge-Blaster Plus 34.
- 3923 7 Personal Trainer SAT. 34.
- ★ **Deadly Games ... 30 day MBG**
- 2811 7 Bomber or 3460 7 Battle of Britain II . ea. 31.
- EARTHQUEST**
- 3118 7 EARTHQUEST Ecology 1.0 34.
- 8050 7 EARTHQUEST 2.0 34.
- Electronic Arts**
- 6716 Pipe Dream 1.2 17.
- 1303 7 Loom 1.0 29.
- 8194 Armor Alley 1.1 32.
- 1907 7 PGA Golf or 2963 7 Starflight II 1.0 . ea. 39.
- 3385 7 Secret of the Silver Blades 39.
- 8643 7 Harpoon. 39.
- 2962 7 Harpoon Challenger Pak 59.
- FTL/Software Heaven**
- 1555 OIDS 1.2 24.
- ★ **Great Wave ... 30 day MBG**
- 2276 7 Kid's Time 1.3 or 5642 7 Kid's Math 1.1 . 25.
- 2270 7 American Discovery 3.0 25.
- 1517 7 ReadingMaze. . 25. 1513 7 (Color). . 35.



★ **Baseline Publishing ... 30 day MBG**

7785 7 **Talking Moose**—1991 MacUser Editors' Choice Award for *Best Desktop Diversion* . . \$23.

7783 7 **INIT Manager 1.1**—Locate, manage and analyze all your startup documents . . . 34.

3114 7 **INIT Info Pro**—Guide to INIT and system incompatibilities. 39.

- 4334 7 NumberMaze. . 25. 8527 7 (Color). . 35.
- 8044 7 NM Decimals & Fractions (Color) 35.
- ★ **HyperGlot Software ... 30 day MBG**
- 7 Word Torture 4.0—Beginner to Advanced (Span., Fren., Germ., Ital. & Rus.) . . . ea. 34.
- 7 Pronunciation Tutor - Beginner (Span., Fren.) . . ea. 35. (Germ., Chin.) . . 38.
- 7 Verb Tutor - Intermediate (Spanish, French, German) ea. 38.
- 7 Tense Tutor 2.0 (Spanish, French, German, Italian) . . . ea. 38.
- 7 Survival Manual (Span., Fren., Germ., Ital., Chin. & Rus.) . ea. 38.
- ★ **Inline Design ... 30 day MBG**
- 1562 7 3 in Three 31.
- 1944 7 Swamp Gas 31.
- 8809 7 Tesseract (addictive puzzle) 31.
- 7622 7 Darwin's Dilemma 2.0 (Feb. '92) 31.
- 3414 7 Mutant Beach. 43.
- Interplay Productions**
- 1894 7 BattleChess (3D animation) 29.
- 3520 7 Dvorak on Typing 29.
- 1893 7 CheckMate (infinite play levels) 31.
- 3534 7 Castles 1.0 (Feb. '92) 34.
- ★ **Learning Company ... 30 day MBG**
- 2670 7 Reader Rabbit 3.0 (CP) (ages 4-7) . . . 34.
- 3272 7 Outnumbered 1.0. 34.
- 3281 7 The Writing Center 1.0 51.



★ **ON Technology ... 1 year MBG**

1566 7 **STATUS*Mac 2.0.2 (unlimited)**—Network configuration mgmt. software which remotely gathers accurate hardware & software info . 749.

9801 7 **Meeting Maker** (5 user) 309.

2570 7 **Instant Update** (2 user) 309.

- ★ **Leister Productions ... 30 day MBG**
- 7126 7 Reunion 3.0 \$115.
- Mallard Software**
- 7 Scenery Disks 1-4 Flight Simulator. . ea. 30.
- ★ **MECC ... 30 day MBG**
- 3963 7 Oregon Trail 1.0 28.
- 3960 7 Number Munchers 1.2. 28.
- 3959 7 Word Munchers 1.2 28.
- 4095 7 Super Munchers 1.0. 28.
- ★ **Microsoft ... 30 day MBG**
- 2868 7 Flight Simulator 4.0 (CP) 42.
- ★ **Mysterium Tremendum ... 30 day MBG**
- 5841 7 Moriarty's Revenge 1.03 32.
- ★ **Nordic Software ... 30 day MBG**
- 8258 Turbo Math Facts 1.1 24.
- 8260 7 Word Quest 1.0 30.
- 8257 7 PreSchool Pack - Color 1.0. 34.
- 2716 7 Word Search Deluxe 1.0. 34.
- ★ **Penton Overseas ... 30 day MBG**
- 7 VocabuLearn/ce Levels I & II (Span., Fren., Germ., Ital., Rus., Japan., & Heb.) . . . ea. 35.
- 7 VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.) ea. 35.
- 7 PICTURE-IT! (Spanish, French, German, & Italian) ea. 40.



★ **Inline Design ... 30 day MBG**

1562 7 **3 in Three**—1991 MacUser Editors' Choice Award for *Best Game* \$31.

1944 7 **Swamp Gas**—Honorable Mention—1991 MacUser Editors' Choice Award for *Best Children's Program* 31.

- ★ **Personal Training Sys. ... 60 day MBG**
- 7 Basic Macintosh (modules 1-4) ea. 59.
- 7 Converting 6.0 to 7.0 (modules 1-2) . ea. 59.
- 7 Excel 2.2, 3.0 (modules 1-9) ea. 59.
- 7 FileMaker Pro (modules 1-5) ea. 59.
- 7 FreeHand 3.0 (modules 1-5) ea. 59.
- 7 HyperCard 1.0, 2.0 (modules 1-4) . . . ea. 59.
- 7 PageMaker 4.0 (modules 1-6) ea. 59.
- 7 Persuasion 2.0 (modules 1-4) ea. 59.
- 7 QuarkXPress 3.0 (modules 1-4) ea. 59.
- 7 System 7 (new users) (modules 1-3) . ea. 59.
- 7 Word 4.0 (modules 1-4) ea. 59.
- 7 Works 2.0 (modules 1-4) ea. 59.
- Postcraft International**
- 6466 7 Citadel 1.21 26.
- Sierra On-Line**
- 9733 Hoyle's Book of Games II 20.
- 7367 Space Quest III. 34.
- 2522 Space Quest IV or 2523 7 King's Quest V . ea. 39.
- Sir-Tech Software**
- 8228 Wizardry II: Knight of Diamonds. 28.
- 8229 7 Bane of Cosmic Forge 35.
- ★ **SoftStream ... 30 day MBG**
- 4073 Colour Billiards. 38.
- 3501 7 Classic Trilogy (Cribbage, Whist, Hearts) 50.
- 3472 7 Family Cards (Solitaire, Rummy, War) . . 50.
- Software Toolworks**
- 4619 7 Mavis Beacon Typing 1.3 (CP) 32.
- 1908 7 World Atlas 1.0 52.

we may have the key



★ **SuperMac Technology ... 30 day MBG**
VideoSpigot—Digital-video frame grabber for making QuickTime movies. Includes VHS Video Input via RCA jack.
 4122 *VideoSpigot LC or 4114 VS IIsi*... ea. \$447.
 4164 *VideoSpigot (for NuBus)*... 536.

★ **Spectrum Holobyte ... 30 day MBG**
 8180 ⑦ *Faces 1.0*... 14.
 3464 ⑦ *Tetris 1.3* or 6112 ⑦ *Welltris 1.1*... ea. 22.
 3017 ⑦ *Wordtris 1.0*... 27.
 3459 ⑦ *Falcon 2.2.1* or 8181 ⑦ *Vette 1.0*... ea. 33.
 ★ **Spinnaker ... 30 day MBG**
 2328 *Sargon IV 1.03 (CP) (chess)*... 28.
 ★ **Strategic Studies ... 30 day MBG**
 8085 ⑦ *Panzer Battles 1.3.2*... 26.
 2685 ⑦ *American Civil War 1.0*... 29.
 3287 ⑦ *Warlords (empires at war) (Feb. '92)*... 34.
StudyWare
 ⑦ *ACT, GMAT, GRE, or SAT Prep*... ea. 29.
 8098 ⑦ *LSAT Prep for the Mac 3.7*... 35.
Terrace Software
 9970 ⑦ *Mum's The Word Plus 1.01 (color)*... 107.
 ★ **Toyogo ... 30 day MBG**
 7836 ⑦ *NEMESIS Go Junior 5.0*... 19.
 1993 ⑦ *NEMESIS Scribbler 5.0*... 29.
 7624 ⑦ *NEMESIS Go Master 5.0*... 39.
 7623 ⑦ *NEMESIS Go Master Deluxe 5.0*... 99.



★ **Sound Source ... 30 day MBG**
 3547 ⑦ *Star Trek: The Logical Collection*—Exciting new Star Trek sounds. Incl. everyone's favorite dialog, sound effects and music cues... \$29.
 3607 ⑦ *Star Trek: The Final Frontier*—Features sounds for the hard-core Trekkie... 29.
 4920 ⑦ *Star Trek: The Bundle*... 49.

★ **XOR ... 30 day MBG**
 6040 *MacGolf Classic*... \$52.

VIDEO & SOUND MONITORS, MUSIC, ANIMATION

★ **Ars Nova ... 30 day MBG**
 1215 ⑦ *Practica Musica 2.2*... 66.
 ★ **Bogas Productions ... 60 day MBG**
 6135 *Super Studio Session with Music Library*... 99.
Coda Music Systems
 8188 ⑦ *MusicProse 2.1*... 189.
 5604 ⑦ *Finale 2.6.1*... 549.
Full Logic Studios
 1163 ⑦ *Mac-Sound (241 great sound effects)*... 75.

★ **MacroMind•Paracomp ... 30 day MBG**
 2199 *MacRecorder Sound System*... 174.
 6159 ⑦ *MacroMind Accelerator 3.0*... 135.
 9353 ⑦ *MacroMind MediaMaker 1.2*... 479.
 5087 ⑦ *MacroMind Director 3.0*... 689.
 2246 ⑦ *MacroMind Three-D 1.0*... 1025.
Mass Microsystems
 2592 *QuickImage 24*... 289.
Rival Monochrome Systems... ea. 1199.

★ **Nutmeg Systems ... 30 day MBG**
 ⑦ *19" for SE, SE/30, II, IIsi*... ea. 995.
 ⑦ *19" for GrayScale SE/30, II, IIsi*... ea. 1295.
 ⑦ *20" Color System: SE/30, II, IIsi*... ea. 2595.

Passport Designs
 8253 ⑦ *TRAX 2.2*... 68.
 3115 ⑦ *MIDI Interface*... 79.
 3117 ⑦ *Master Tracks PRO 4 4.5.3*... 315.
 8250 ⑦ *Encore 2.51*... 379.

PCTV
 2244 *System 7 Video . 9. 2245 w/Lon's Book . 25.*
Pixar
 1596 ⑦ *ShowPlace & MacRenderMan Bundle* 645.

RasterOps
 Video Expander... 499.
 3224 *Expresso Slide Scanner*... 699.
 9784 *RasterOps 24SX. 649. 8944 24STV. 1249.*
Software Toolworks
 5201 *The Miracle (piano teacher)*... 349.

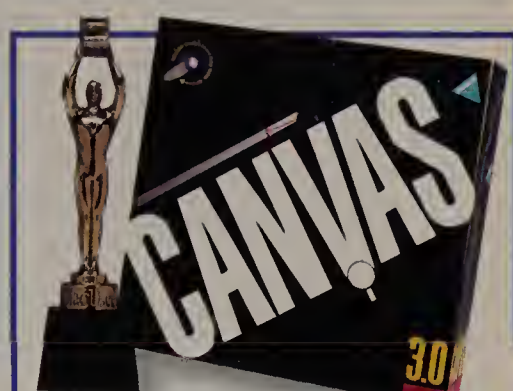
★ **Sound Source ... 30 day MBG**
 3547 ⑦ *Star Trek: The Logical Collection*... 29.
 3607 ⑦ *Star Trek: The Final Frontier*... 29.
 4920 ⑦ *Star Trek: The Bundle (I gotta have both!)* 49.

★ **SuperMac Technology ... 30 day MBG**
 4139 *Monochrome Card (NuBus only)*... 357.
 4134 *19" Gray-Scale/Mono Display*... 999.
 1805 *19" SuperMatch Color Display*... 1799.
 1813 *Color Calibrator*... 549.
 1877 *Spectrum/8LC or 2026 S/8si*... ea. 536.
 1844 *Spectrum/8 Series III*... 536.
 1851 *Spectrum/24 Series III*... 1525.
 2330 *Spectrum/8-24 PDQ or 2231 PDQsi*... ea. 899.
 4122 *VideoSpigot LC or 4114 IIsi*... ea. 447.
 4164 *VideoSpigot (for NuBus)*... 536.

★ **Voyager ... 30 day MBG**
 9322 ⑦ *Voyager Videostack CD 2.2*... 65.
 9328 ⑦ *Voyager CD Audiostack*... 65.
 9326 ⑦ *Beethoven: Symphony No. 9 CD 2.0*... 65.

CD-ROM

Adobe Systems
 8794 ⑦ *Adobe Type On Call CD/ATM*... 47.
CD Technology
 2321 *CD-ROM Caddy*... 11. 2533 (5)... 49.
 8057 *Porta Drive CD-ROM*... 599.
 4140 ⑦ *Multimedia HANDisc*... 75.



★ **Deneba Software ... 30 day MBG**
 3227 ⑦ *Canvas 3.0*—1991 MacUser Editors' Choice Award for *Best Drawing Program*. Features Bezier font outlines, professional word-processor-like text capabilities, object blending, a freehand Bezier curve tool, and more... \$248.

★ **Cyan ... 30 day MBG**
 2717 ⑦ *Cosmic Osmo 1.1 (CD-ROM)*... 37.
 ★ **Discovery Systems ... 60 day MBG**
 9967 ⑦ *Nautilus (subscription, CD-ROM)*... 20.
 9965 ⑦ *Sherlock Holmes (CD-ROM)*... 26.
 9966 ⑦ *Shakespeare on Disc (CD-ROM)*... 26.
 9968 ⑦ *Birds of North America (CD-ROM)*... 50.
 1874 ⑦ *Mammals of No. America (CD-ROM)*... 50.
 2484 ⑦ *The Family Doctor (CD-ROM)*... 115.

★ **Everex ... 30 day MBG**
 1875 *Metro CD-ROM Drive 1.3*... 469.

★ **Highlighted Data ... 30 day MBG**
 7771 ⑦ *Webster's Dictionary (CD-ROM)*... 159.

★ **HyperGlott ... 30 day MBG**
 7473 ⑦ *Learn To Speak French (CD-ROM)*... 62.
 7829 ⑦ *Learn To Speak Spanish (CD-ROM)*... 62.
 2615 ⑦ *Lingua ROM II (3-CD Set)*... 599.

★ **ICOM Simulations ... 30 day MBG**
 3717 ⑦ *Sherlock Holmes Consulting Detective* 39.

★ **Microsoft ... 30 day MBG**
 6382 ⑦ *The Microsoft Office (CD-ROM)*... 479.



★ **Prometheus ... 30 day MBG**
 8990 ⑦ *ProModem Ultima Home Office—V.32bis* Ultima with voice feature added at an even lower price, turns your Mac into an answering machine. 14,400 bps data modem with V.42bis/MNP 5 & 9600 bps S/R fax & full voice capability! . \$489.

390C

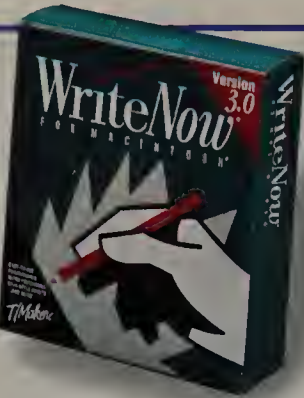
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★ T/Maker ... 30 day MBG

3639 ⑦ *WriteNow 3.0*—The fastest Mac word processor. A 2x winner of *MacUser's Best Word Processor Award*. Incl. a lightning-fast 135,000-word spell checker, a thesaurus DA, powerful style sheets, MS Word compatibility \$155.

NEC

- 6625 Clip-Art 3D (2500 full-color images) 246.
- 6636 Image Gallery (2800 line art) 246.
- 9441 CDR36 CD-ROM Portable Drive 399.
- 2595 General Reference CD-ROM Bundle (includes CDR36, kit & 7 titles) 529.
- 5161 CDR73 CD-ROM Drive 599.

★ Penton Overseas ... 30 day MBG

- 2611 ⑦ Vocablearn/ce 2.0 Spanish 1 CD 69.
- 2610 ⑦ Vocablearn/ce 2.0 French 1 CD 69.

Pixar

- 3566 ⑦ Showplace & RenderMan CD-ROM .. 448.

Software Toolworks

- 3915 Grolier Encyclopedia (CD-ROM) 249.
- 4397 Time Table History (CD-ROM) 57.

★ Voyager ... 30 day MBG

- 3918 ⑦ Baseball's Greatest Hits (Feb. '92) 39.
- 3921 ⑦ Mozart Dissonant Quartet CD 39.
- 3917 ⑦ A Silly, Noisy House CD 39.
- 3919 ⑦ Amanda Stories CD 39.
- 3316 ⑦ Exotic Japan CD 1.0. 65.

COMMUNICATIONS

MODEMS, MAIL, NETWORKS

★ Abaton ... 30 day MBG

- 6266 InterFax 24/96 Modem 289.
- 2724 InterFax 24/96 with InterShare 339.

★ Applied Engineering ... 30 day MBG

- 8362 ⑦ QuadraLink (with AE Shadow) 205.

★ Argosy Software ... 30 day MBG

- 7872 ⑦ Software Bridge/Mac 2.0.1 99.
- 2447 ⑦ RunPC/Remote 139.
- 2448 ⑦ RunPC/Network 279.

★ CE Software ... 60 day MBG

- 8066 ⑦ QuickMail (5 user) 249. 8067 (10 user) 375.
- 1589 ⑦ QuickMail (50) .. 1549. 3489 (100) .. 2899.

★ CompuServe ... 60 day MBG

- 1676 ⑦ Macintosh Membership Kit 1.5 25.
- 1673 ⑦ CompuServe Navigator 3.04 49.
- 1674 ⑦ Membership Kit/Navigator Bundle 72.

★ DataViz ... 60 day MBG

- 1823 ⑦ MacLink Plus/PC 6.0 129.
- 4842 ⑦ MacLink Plus/Translators 6.0 109.

★ Dayna ... 60 day MBG

- DaynaPORT E: (10BASE-T) ea. 207.
- DaynaPORT E: SE, SE/30, II, IIsi, LC ... 207.
- 8719 EtherPrint or 9888 (10BASE-T) ea. 345.

Dove Computer

- 6758 ⑦ DoveFax 2.0 . 269. 3352 NuBus . 329.
- 9634 ⑦ DoveFax Plus . 395. 4111 NuBus . 429.
- 4110 ⑦ DoveFax LAN . 499. 4109 NuBus . 529.

★ Farallon Computing ... 30 day MBG

Full line available. Partial listing.

- 9805 ⑦ Timbuktu 4.0.2 \$129.
- 4866 ⑦ Timbuktu/Remote 3.0 129.
- 6273 PhoneNET StarConnector 10-Pack 129.
- 4869 PhoneNET Connector 10-Pk (DIN8) 198.
- 2206 PhoneNET StarController 307 899.
- 4802 PhoneNET StarController 357 1025.
- 4814 PhoneNET StarController 377 1299.
- 9961 PhoneNET Card PC. 209.
- PhoneNET Ethernet Card (SE/30, II, si) ea. 173.
- PhoneNET Ethernet Card (10 pack) ea. 1659.

★ Freesoft ... 60 day MBG

- 6115 ⑦ White Knight 11 85.

★ Global Village ... 30 day MBG

- 8946 ⑦ TelePort A300 1.06 129.
- 8945 ⑦ TelePort/FAX 1.06 169.
- 5327 ⑦ TelePort/Full FAX 2.0 219.
- 5321 ⑦ PowerPort/V.32 2.0 489.

Hayes

- 2300 ⑦ Smartcom II for the Mac 3.3 84.
- 8614 Personal Modem 2400 Plus 149.
- 3522 OPTIMA 96 Modem 389.
- 7391 ULTRA 96 Modem 669.

★ IBS ... 30 day MBG

- 8581 DataClub Classic (3) . 265. 8580 (10) . 539.
- 1495 DataClub Elite 939.



★ Letraset ... 30 day MBG

6300 ⑦ *FontStudio 2.0*—1991 MacUser Editors' Choice Award for *Best Typographic Product* \$359. *FontEK Typeface Collection*—100 new innovative typefaces avail. Each package contains True Type and PostScript Type 1 font formats ea. 30.

Insignia Solutions

- 7557 ⑦ Access PC 1.1 60.
- 9726 ⑦ Entry Level SoftPC 2.5 125.
- 4089 ⑦ Universal SoftPC 2.5 195.
- 3229 ⑦ SoftAT 2.5 299.
- 3441 ⑦ SoftNode 1.0. . 105. 3454 (10 Pak) .. 699.

★ Microcom ... 30 day MBG

- 7459 ⑦ CarbonCopy Mac 2.0 (single) 59.
- 1556 ⑦ CarbonCopy Mac 2.0 (unlimited) 179.

★ Microsoft ... 30 day MBG

- 9444 ⑦ Microsoft Mail 3.0 (1-5 user) 269.

★ Orange Micro ... 30 day MBG

- 2392 ⑦ Orange386 (20 MHz) 1799.

★ Practical Peripherals ... 30 day MBG

- 8994 2400 V.42 bis Modem 199.
- 7934 PM9600SA Modem 1.26 469.
- 9849 ⑦ SmartPack 9600 (with Smartcom II) .. 529.

★ Prometheus ... 30 day MBG

- 2590 ⑦ ProModem 2400 Mini Plus 129.
- 3832 ⑦ ProModem Remote Plus 225.
- 3232 ⑦ ProModem 24/96 S/R Minifax Plus ... 269.
- 3831 ⑦ ProModem 9600M-EC 375.
- 8990 ⑦ ProModem Ultima Home Office 489.

PSI Integration, Inc.

- 3143 ⑦ COMstation One 249. 3142 ⑦ Two 299.
- 5340 ⑦ COMstation Four 439.



★ Berkeley Systems ... 30 day MBG

2198 ⑦ *More After Dark (M.A.D.)*—Honorable Mention—1991 MacUser Editors' Choice Award for *Best Desktop Diversion*. 25 new displays .. \$23.
5737 ⑦ *After Dark 2.0V*—Stops screen burn-in. 28.
2196 ⑦ *After Dark & M.A.D. Bundle* 40.

- 5339 ⑦ TravelCOM (pocket modem) 499.
- 5320 ⑦ PowerModem (for PowerBook) 215.

★ Shiva ... 30 day MBG

- 3444 ⑦ NetSerial 1.35 275.
- 4347 NetBridge or 4942 ⑦ TeleBridge 409.
- NetModem/E (thick, thin, 10BASE-T) ea. 1679.

Sitka/TOPS

- 4188 Teleconnector (DIN8) . 23. 2230 (10) . 189.
- 6264 ⑦ TOPS Network 3.1 187.

★ Software Ventures ... 30 day MBG

- 3455 ⑦ MicroPhone II 4.0 215.

★ Synergy ... 30 day MBG

- 6618 ⑦ VersaTerm 4.6 . 90. 6619 PRO 3.6 . 177.

★ TechWorks ... 30 day MBG

- 1582 ⑦ GraceLAN . 285. 1584 Corporate . 689.
- 1781 ⑦ GraceLAN Update Mgr. Single Zone . 169.
- 1782 ⑦ GraceLAN Update Mgr. Multiple Zone . 285.
- 1767 ⑦ GraceLAN Asset Manager 499.

★ White Pine Software ... 30 day MBG

- 3535 ⑦ Mac 240. . 139. 3541 ⑦ Mac 241. . 199.
- 3544 ⑦ Exodus 3.0 199.

★ Zoom Telephonics ... 30 day MBG

- 1168 ⑦ MX2400R Modem (w/⑦ QuickLink II) .. 69.
- 1176 ⑦ MX2400S Modem (with SendFax 9600) 79.
- 2310 ⑦ FX9624 Send/receive Fax/Modem ... 119.
- 3576 ⑦ FX9624V Send/receive V.42 Fax/Modem 145.
- 1179 ⑦ V.42bis Modem (with MacPack) 125.
- 2311 ⑦ V.32 Turbo Modem (with MacPack) .. 276.



Insignia Solutions

3229 ⑦ *SoftAT 2.5*—With SoftAT, you can run virtually any MS-DOS program on your Macintosh. You need no special hardware. With SoftAT, your next MS-DOS computer could be a Macintosh. \$299.



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- 7432 ⑦ Scan 300/GS (reqs. Scan Kit) \$829.
- 2742 Scan 300/Color (reqs. installation kit) 989.
- 1496 Inst. Kit for 300/Color with Photoshop. 479.
- 1537 LaserScript LX 1729.

★ Advanced Gravis ... 30 day MBG

- 9963 ⑦ Gravis Mouse Stick. 59.
- 9964 ⑦ Gravis Super Mouse. 79.

American Power

- 5895 UPS 110SE 209. 6686 UPS 370ci 339.
- 3447 SurgeArrest Plus 39.

Caere

- 8124 ⑦ Typist Plus Graphics 475.
- 4476 ⑦ OmniPage 3.0 475.
- 4930 ⑦ OmniPage Professional 1.01 669.

CoStar

- 1884 ⑦ LabelWriter II 189.
- 1418 AddressWriter 498.
- ⑦ Stingray ADB (platinum or black) ea. 89.

★ Curtis Manufacturing ... 30 day MBG

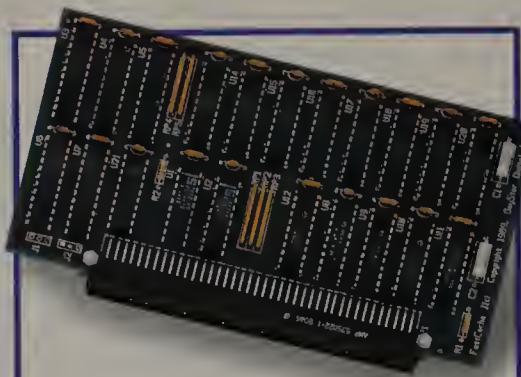
- 8046 MVP Mouse (MVP-1) 89.

★ Datasdesk ... 30 day MBG

- 9830 ⑦ MAC101E. 129. 2384 with QuicKeys. 149.
- 6901 Switchboard (modular keyboard) 159.

★ Everex ... 30 day MBG

- 1144 ⑦ Silhouette Trackball 1.0 (ADB Macs) 78.



★ DayStar Digital ... 30 day MBG

FastCache—Highly-rated *FastCache* is now available for the Mac IIci, IIsi & the Quadra 700 or 900. Mac IIsi version includes adapter and optional FPU. Quadra version increases speed up to 40%. see line listing.

- 1982 ⑦ Scanmaker 1850S 1999.
- 4505 ⑦ Truelaser (with toner) 1399.

Monster Design Group

- MacSpeakers (two, stereo) 169.

★ Mouse Systems ... 30 day MBG

- ⑦ Little Mouse or ⑦ Little Mouse Plus ea. 74.
- 3005 ⑦ A³ Trackball (ADB) 79.

★ Orange Micro ... 30 day MBG

- 3036 ⑦ Grappler 2.0 92. 6229 ⑦ LX 111.

★ Sophisticated Circuits ... 30 day MBG

- 8009 ⑦ PowerKey 2.01 76.
- 8008 ⑦ PowerKey Remote 32.

Thunderware

- 4994 ⑦ LightningScan 400 359.
- 3107 ⑦ LightningScan Pro 256 499.

★ Tripp Lite ... 30 day MBG

- 3350 MacDirector (5 outlets & modem protection) 72.
- 6200 IB-6 (6 outlets, Gold Seal Warranty) 59.

UPGRADES & DRIVES

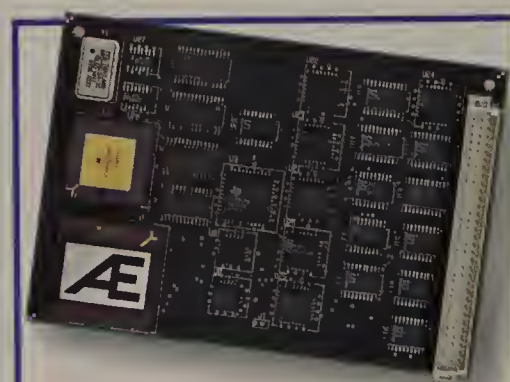
MEMORY, ACCELERATORS

SIMMs ... with free video & manual

- 8316 1 MB SIMMs (80ns, set of 2) 79.
- 9437 2 MB SIMMs for IIsi or II LC 79.
- PowerBook memory call

★ Applied Engineering ... 30 day MBG

- 2532 QuickSilver Accelerator for the IIsi 299.



★ Applied Engineering ... 30 day MBG

Experience a new world of LC speed with TransWarp LC. At 33 MHz you'll get up to three times the speed of the standard LC.
4147 TransWarp LC (33 MHz) \$999.
4903 TransWarp LC (40 MHz) 1199.

- 1971 FastMath LC. \$139.
- 4850 FastMath Classic II 169.
- 8361 ⑦ 1.44 MB High Density Drive 229.
- 5290 ⑦ Plus Drive (FDHD for Plus & SE) 309.
- 3319 TransWarp SE (25 MHz) 799.
- 3317 TransWarp SE (40 MHz) 1475.
- 4147 TransWarp LC (33 MHz) 999.
- 4903 TransWarp LC (40 MHz) 1199.

Computer Care

BookView Imperial (memory and video card for Apple's PowerBooks) call
BookRAM 2S, 4S, 6S, DRAM 4 call

★ Dayna ... 60 day MBG

- 8722 DaynaFile II 1.2 5 1/4" Drive 429.

★ DayStar Digital ... 30 day MBG

Does not include optional math chip.

- 8949 LT200 Connection (PC) 175. 8950 (MC) 279.
- 3584 DualPort IIsi with 20 MHz 68882. 165.
- 8556 ⑦ FastCache for Mac IIci 265.
- 3401 ⑦ FastCache IIsi 299.
- 3389 ⑦ FastCache IIsi with FPU 369.
- 1613 ⑦ FastCache 040 (for Quadra) 349.
- PowerCache for SE/30, II, IIs, IIsx, IIsi, LC 40 MHz 899. 50 MHz 1399.
- RAM PowerCard (various memory config.) call



Envivio

NoteBook Display Adaptors—1991 MacUser Editors' Choice Award for Best Display Product. Connect your PowerBook to Apple and VGA compatible displays and projection devices with up to 256 colors. see line listing

Envivio

- 1819 Notebook Display Adaptor (1 MB) 549.
- 1812 (2 MB) 699. 1842 (4 MB) 1099.
- 1848 Notebook Display Adaptor 030 (1 MB) 629.
- 1837 (2 MB) 939. 1835 (4 MB) 1249.

Dove Computer

- 9788 Racer 030 for Plus 399.
- 9790 Racer 030 for SE 399.
- 9789 Racer 030 for Mac II 739.

★ FWB, Inc. ... 30 day MBG

- 2320 HammerDisk44 (removable) 739.
- 1802 HammerDisk88 (removable) 999.
- 2331 PocketHammer 50 569.
- 2329 PH 100 769. 2314 PH 200 1199.
- 1801 Hammer300 1899. 1803 PH 425 2199.
- 2341 Hammer Internal 50is 389.
- 2333 100is 599. 2334 200is 999.
- 1795 300is 1699. 1794 425is 1999.

IOMEGA

- 2224 90 MB Transportable (reqs. kit) 799.
- 2467 Gold Std. Rem. Disk (90 MB, tri-pak) 439.
- 7789 ⑦ Mac 1B Interface (w/Central Pt. Backup) 39.
- 2466 ⑦ Mac 2B Interface (w/Retrospect) 99.

Mass Microsystems

- 2605 DataPak 45 649. 2599 DataPak 88 849.
- 2973 Diamond 120 MB Hard Drive 639.
- 2972 Diamond 210 MB Hard Drive 1049.
- 2969 Diamond 320 MB Hard Drive 1699.
- 2952 Diamond 510 MB Hard Drive 2149.

GDT Softworks

- 3429 ⑦ BetterWriters 1.0 (software drivers) 39.
- 6256 ⑦ PrintLink Collection/Serial 4.0.1 59.
- 8959 ⑦ PrintLink Collection/Parallel 4.0.1 139.
- 6151 ⑦ JetLink Express/Serial 2.1 89.

Hewlett-Packard

- 6514 HP B&W DeskWriter (w/cartridge) 479.
- 2964 HP Color DeskWriter C (w/color cart.) 849.
- 3596 HP ScanJet IIc (color) 1599.

★ Kensington ... 30 day MBG

- 2547 ⑦ Turbo Mouse 3.0 ADB 107.

Koala

- 2593 ⑦ MacVision Gray-Scale Digitizer 3.5 259.
- 2879 ⑦ MacVision Color Digitizer 1.1 499.

★ Logitech ... 30 day MBG

- 1671 ⑦ MouseMan. 77. 1672 ⑦ TrackMan. 89.
- 5082 ⑦ ScanMan Model 32 G-Scale Scan. 299.

★ MicroSpeed ... 30 day MBG

- 2807 ⑦ MicroTRAC (for SE & II family) 75.
- 6621 ⑦ MacTRAC ADB 2.0 (SE & II family) 75.

★ Microtek ... 30 day MBG

- 1981 ⑦ MS-II OCR Scanner 849.
- 1978 ⑦ Scanmaker 600GS 849.
- 1985 ⑦ Scanmaker 600ZS 1449.



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9634 ⑦ DoveFax Plus 2.0—Now System 7 compatible! Combines 3 popular office machines into one small package. 2400 bps modem/9600 bps send/receive fax will also answer your phone and allow users to leave voice mail. \$395.

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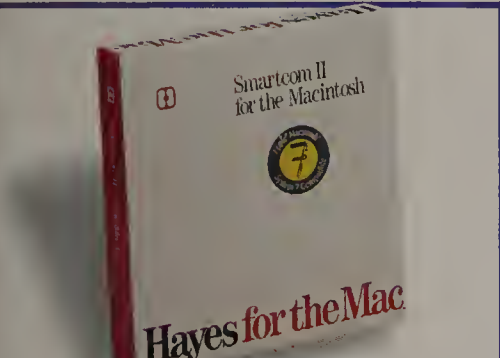


★ **Argosy Software ... 30 day MBG**
 7872 ⑦ *Software Bridge/Mac 2.0.1*—Translate documents between over 30 Mac and PC word processors. Mount DOS disks . . . \$99.
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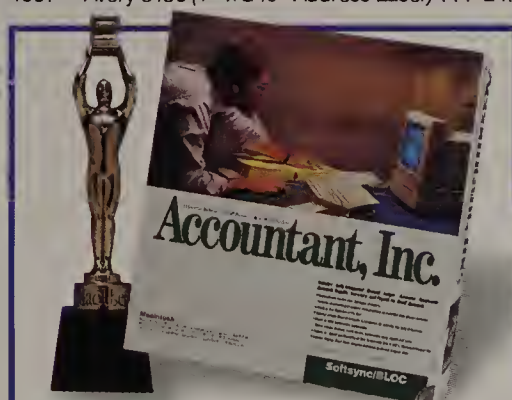


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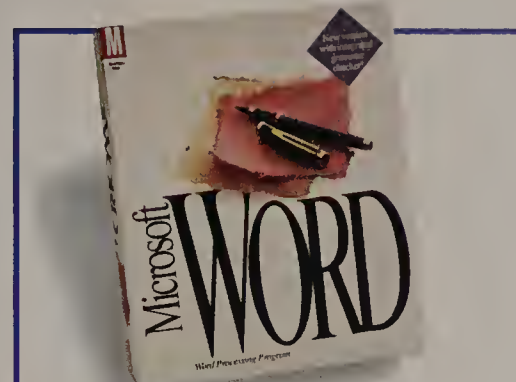
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Sensitive New Age Software

BY STEVEN LEVY

THE NEW ENGLAND WINTER was tough this year. First snow fell in early November, and kept falling. But it was not the snow but the recession that covered Massachusetts like a damp blanket. Gloom was rampant and contagious. It found its way to my electronic cottage in the deep woods. I had spent many months staring at a book manuscript on my monitor, and now I was done. Still, the dreariness lingered.

Just as daylight saving time seemed eons away, and I began to daydream constantly about moving to Cicely, Alaska (where people apparently know how to cope with this sort of thing), the dogsled arrived with a new shipment of software. To my delight—and, I hoped, my salvation—these were not word processors, spreadsheets, or tax programs. This was software for the mind. Software for the spirit. Software for the soul.

I was the lucky recipient of packages representing a budding genre of Mac programs: Sensitive New Age Software. I hoped it would be just the thing to liberate me from the land of despond and transport me, to strains of Windham Hill music, to Elysian fields of good feeling. Perhaps I would get in touch with my shaman self. Or even meet Shirley MacLaine.

Old Business

THE NEW AGE IS NOTHING IF NOT ancient, and that's why at first blush it seemed a little weird to use the Macintosh to plug into it. We look toward the distant past, with its pagan rituals and paucity of good things to watch on television, for spiritual inspiration. But the premise of Sensitive New Age Software puts a modern spin on the situation. It would have you believe that the alchemists, magi, and sorcerers in those creaky days of yesteryear would have performed even more-powerful magic if they'd had Classics, Ilci's, and Quadras at their disposal.

Take something as time-honored as astrology. A guy like me, whose familiarity with astrological jargon begins and ends with the original cast album of *Hair*, could never contemplate charting his own horoscope in the comfort of his office or den before personal computers. At \$199, Mac-

Horoscope, from Time Cycles Research, promises to do just that, with the salient passages written by no less an authority than Julia Lupton Skalka, who pens a column for *Dell Horoscope*, one of those little magazines sold at supermarkets.

Though the program is ostensibly geared to everyone from astro-dolts to experienced horoscope readers, I found the manual spiced with cryptic terms. Typical sentence: "Maximum orbs allowed for each aspect are found in Appendix C." Fortunately, all you really need to know is where and when you were born (the program figures out the latitude and longitude). The program quickly generates charts with neat little symbols fraught with meaning. I printed out the charts for my birth, stared at them blankly, then tossed them out. Then I got to the meat of the program, Skalka's long interpretations.

These provided a zodiacal house-to-house recap of the chart, with indications of what this meant for my future. My chart was full of information, but much of it was so cagily stated that the meaning was rather elusive. In an alarming number of cases I got a declarative sentence followed by a qualifier like "This is not necessarily the case." So I wasn't surprised when I found in the 16-page assessment a lot of stuff that sounded like me and a lot that didn't. There were several references to a career in writing and publishing, but there was also a suggestion that a vocation of marine biology, cosmetic surgery, or something to do with feet (anything from dancing to selling shoes) might be in the stars for me. Most distressing was "an implication of financial loss, or loss of social status through marriage, sexually related disease, or neurotic social tendencies." Thanks, I needed that.

I didn't create any more charts—why subject my loved ones to this? But I did examine the horoscope of actor Hal Holbrook, which was inexplicably included in the package. (The programmer later explained to me that Holbrook's was a sample chart, chosen to avoid the controversy that

could come from charting someone like Richard Nixon.) Not knowing much of Holbrook's life, I could not evaluate whether the interpretive reading "got" him. Was he really "idealistic and romantic"? Did he succumb to the danger of becoming a "pseudointellectual and incurable snob"? (I always thought him a man of the people, but maybe I'm confusing him with Mark Twain.) But my ears did pick up in the Moon in Sagittarius section, when it suggested that Hal gravitated to collaborative work situations. Hey, wasn't "Mark Twain Tonight" a *one-man* show?

Wheel of Fortune

STILL BOTHERED BY THE SPECTER OF a social disease or neurotic breakdown, I turned to a program called Psychic Reward, which is sort of a training program for paranormal skills. The coauthors are Jack Houck, characterized as a noted teacher of metal-bending, and Alan Vaughn, who is listed by something called the Central Premonitions Agency as "America's most successful predictor." When I called Vaughn to ask him how he earned that honor, he indicated that his prognostications were too numerous to mention. Suffice it to say that if Robert Kennedy had called Vaughn before the 1968 California primary, history would be singing quite a different tune. Even the creation of Psychic Reward was predictable—it came to him in a dream in 1979.

The program has a lofty goal—to increase one's powers of prediction and ability to mentally manipulate matter. The former, Vaughn informed me, is just about essential in the world of business. "Those oriented toward the future will be better oriented toward predicting than those oriented toward the past," he said, which sounded reasonable. He claimed that in a recent test of captains of industry, 80 percent of those whose companies were most profitable had precognitive ability. I wondered why it was, then, that with many of the same CEOs in charge as before, the economy

continues



*Want to predict
the future?
Control your
destiny?
Screw up slot
machines?*

now resembled a beached whale. "That's the point!" he said. "A lack of intuition has gotten us in the terrible fix!"

Hoping to turn things around for myself and the nation, I booted the program. What I found was a rudimentary diagram of a carnival wheel with the letters of the alphabet. The would-be psychic chooses a letter and the wheel spins, choosing a letter. If the letters match, the program grants the user 10,000 points. If it comes close, the user gets fewer points.

If it isn't close, no points. After many trials, the score is totaled and compared with chance picks. Presumably, one learns to sense what letters are coming up and gets better. After many trials I did not. I guess I am not destined to be a CEO, unless in a failing company.

The other part of the program lets the computer make the guesses. Your job is to try to send out brain waves to make your choices appear. I wasn't able to do it. But Vaughn assured me that after using Psy-

chic Reward, one happy user went to Atlantic City and raked in \$1000 a day by mentally manipulating the slot machines. Though nothing to sneeze at, this seemed a relatively shabby payoff for someone who can predict the future. How about affecting the outcome of, say, a state lottery? Vaughn was discouraging. "Too many people watching," he said. After getting off the phone with Vaughn, I immediately removed Psychic Reward from my hard drive. But he probably knew that.

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Changes in Attitude

MAYBE THE PROBLEM WAS MY ATTITUDE. Fortunately, I had a program to change my mental outlook. It was a desk accessory called Mindset, published by the ultimate Sensitive New Age Software company, a Portland, Oregon, firm called Visionary. It works like this. After installing the program in the System Folder, you are subjected to an inspirational message at predetermined periods—say, every ten seconds. The message replaces the stuff on the menu bar and hangs there for another predetermined period—anything from a subliminal half-second to several seconds. In addition, you can spice this up with another set of messages in the form of witty sayings, tired old aphorisms, lame jokes about the business world, or irreverent quips. These come less frequently and stay on the menu bar longer.

It's the first set, though—the inspirational messages—that supposedly give you the power to change your life. Paul O'Brien, the eponymous visionary of his company, assured me that while the occasional epigram can be entertaining, the "autosuggestions" contain real dynamite: "It's an attitude-control program." He assured me that he uses it daily, writing his own messages to help him achieve his goals. For instance, at any given instant, his menu bar will say, "I am making \$200,000 a month in sales." The fact that his spreadsheet says otherwise is not the point. "It's a belief," says O'Brien, who claims that if you can get your subconscious to accept such a goal, you've got things just about beat.

I set up the program and let the pre-arranged autosuggestions roll. It was as if Norman Vincent Peale had mutated into Big Brother and invaded my Mac via a software virus. "My body, mind and spirit are a healthy team. . . . My income is constantly increasing. . . . I control my thinking and it causes my success. . . . I have a right to have the life I want. . . . I dwell on positive thoughts. . . ." Yuck!

There are hundreds of these, in files devoted to attitudes about health, anger, creativity, faith, spirituality, self-esteem, *continues*

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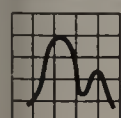
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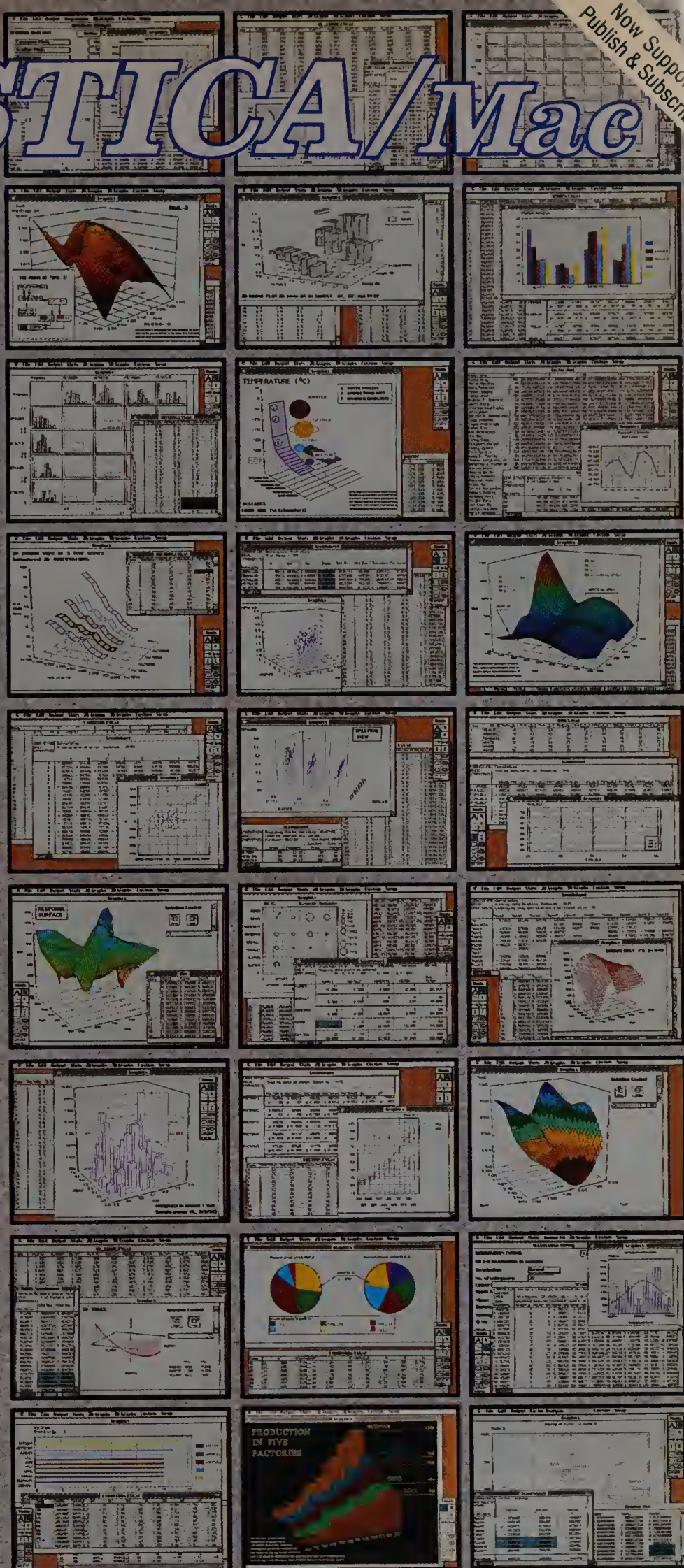
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and related topics. I know they work for Paul O'Brien, but I found them very tough to take. On the other hand, some of the sayings, though they can't remake one's attitude, were pretty amusing. For instance, "The surest protection against temptation is cowardice.—Mark Twain." Or was it Hal Holbrook?

I and I

ULTIMATELY, MINDSET WAS TOO DISTRACTING. I would be in the midst of work,

and the menu bar would flash, derailing my train of thought. Besides, what if it really did remake my attitude? Bad attitude is my business! I turned instead to Visionary's most successful product, Synchronicity. Designed to look like a business application and billed as "the intuitive decision-making tool," Synchronicity is actually a Macintosh implementation of one of the New Age's most sacred texts, the ancient Chinese Book of Changes.

I admit that during an unsettled time

in our nation's history I conducted some youthful experiments with the *I Ching*. But I swore off it when I realized I would be writing a computer column. In any case, I still maintain respect for the book, which responds to questions by presenting one of 64 different hexagrams, little diagrams of 6 lines. The interpretations of these inscrutable icons invariably clarify complex situations. Thus I approached Synchronicity carefully.

The implementation was excellent, perhaps the best of all the Sensitive New Age Software I tested. The color graphics depicted a soothing Oriental garden, and the gong sound was sampled from the Breathing Lotus School of Tai Chi. I began to experience an otherworldly calm as I entered my current dilemma—what comes now, after finishing my book? The program had me enter keywords to consider—I keyed in *book*, *satisfaction*, *money*, *fame*, and *creativity*—and as the words spun around the image of a flame, I touched the keyboard to generate the hexagram.

It generated hexagram number 41, Letting Go. I read in horror:

Learning to accept a decrease in position or material possessions may well be part of the process... suffering from misfortune... a loss of responsibility at work... Let go of frustration, resistance, and regret over financial decreases...

My hands were shaking. Was it too late to revive Mindset and remake my goals? I was about to be thrown penniless into the maw of the recession! I paced the room furiously, wondering if there was any way to convince my Macintosh to retract the reading. Could I get a recount? Eventually I slunk back to my seat and decided to remake my attitude in my own way. Glaring out the window at the bleak winter landscape, I threw the computerized *I Ching* once more, this time entering a word that gave me comfort: *baseball*. And here was the reply:

The Approach of Spring

The period before the approach of spring is a most auspicious time. The promise of good times ahead seems inevitable and there is vitality in the air.

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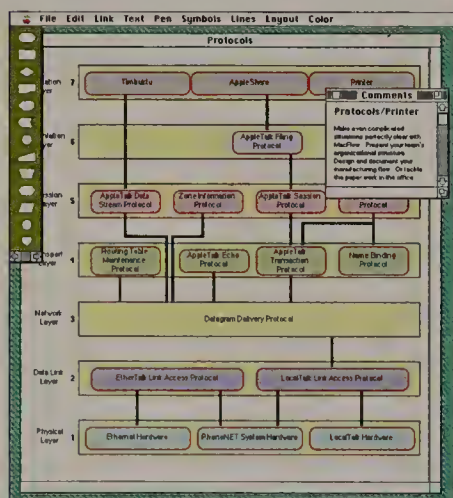
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MacUser, July 1991, Pg. 76

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Artist: Tom Cushwa, Cushwa Studio, New York.



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Clear-Eyed Computing

BY DEBORAH BRANSCUM

THESE DAYS THE TOP OFFICE job-related complaint isn't bad coffee, bosses, or bonuses—it's eyestrain. According to a Harris poll published last fall, 47 percent of office workers questioned put eyestrain at the top of their list of concerns. A survey of optometrists sponsored by antiglare-screen maker OCLI found almost 10 million Americans have annual eye exams as a result of computer-related symptoms.

Associate professor Alan Hedge of Cornell University recently completed a survey of more than 4500 office workers that confirmed the Harris poll figures. "Eyestrain is the number one complaint—it affects over half of all the office workers," Hedge says. "And it's related to computer use. If you plot the reports of eyestrain against the hours that people work on a computer, you get a straight-line relationship. The more hours you spend working on a computer, the more likely you are to report problems of eyestrain."

As people grow older, there's a natural decline in the ability of their eyes to focus smoothly, making bifocals a fact of life for many. But extensive computer use may speed focusing problems. Dr. James Sheedy is chief of the Video Display Terminal Eye Clinic at the University of California, Berkeley, and conducted the national optometrists' survey. The eye specialist says he's been surprised by the number of patients he's seen under the age of 40 whose "eye-focusing mechanism is simply not working as well as it should be." Mac addicts, take note: computer use can make you nearsighted.

Dr. Edward Godnig, a behavioral optometrist, consultant, and coauthor of *Computers & Visual Stress* (Abacus, 1991), argues that "the human visual system originally was evolved out of a distant or far viewing system. And prolonged and persistent near or close viewing is often biologically unacceptable. It can also be argued that working at the computer distance is perhaps the most demanding visual task confronting a large percentage of workers up to this point of history."

Computer users aren't alone in suffering from eye complaints—according to Sheedy, similar problems are seen in law

students, bookkeepers, jewelers, and others who do close work. Simply reading can also cause eyestrain, but there are some notable differences between reading on paper and reading on screen.

"If there is any problem with being able to read a document, like a sheet of paper, then it's easy to move that sheet of paper closer or farther away from you or just change the angle or even change your sitting posture," says Hedge, who points out that computer users move their monitors rarely, instead adapting their bodies to the technology. When you are working with a computer, you tend to actually do visual work for much longer. People become almost glued to the computer because it responds so quickly and you can do things so well. You can easily spend several hours working on a computer without noticing you've spent that amount of time there." As a result, people tend to blink less frequently when they work on a computer, which can contribute to dry eyes and eye irritation.

Light Gets in Your Eyes

EXPERTS SAY THE BIGGEST CULPRITS in eyestrain among computer users are glare and related lighting problems, followed by monitor resolution. There are two types of glare problems. Screen glare is fairly straightforward; that's when the reflections of light fixtures or light objects are visible on a computer screen. Less obvious as a problem is direct glare, from windows or inappropriate light sources. "People used to be looking down at their desks and the overhead lights weren't very close to their field of view," says Sheedy. Now, he says, computer users are staring straight ahead at their screens, which can put overhead lights and bright open windows in their field of view. That creates glare and causes discomfort.

It seems that few office designers understand the visual requirements for comfortable computer use. As a result, offices are often twice as bright as they should be for computer use, says Godnig. Workers

may not be conscious of any stress from such an arrangement, but may pay a price for the dramatic contrast in brightness between computer screen, office lighting, and any external light sources.

"There's a natural tendency for the eyes to move toward the brightest spot in your visual field," according to Hedge. "If you're working with your monitor backing onto a window, your eyes are being drawn toward the window if it's a nice bright day outside. You're having to do a lot of work to keep your eyes on the screen, but you're not aware of that. At the end of the day, you may report that your eyes feel tired, or you may have the start of a headache or something."

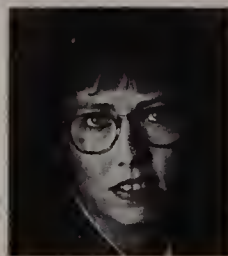
The difference between the brightness of a computer screen and the rest of the work environment, called the contrast ratio, should be no more than 3:1. That is, no one area should be more than three times brighter than another.

Combatting Glare

SIMPLE STRATEGIES CAN IMPROVE the contrast ratio of most offices and can be adapted easily for home use. Like several *Macworld* editors, I've unscrewed the fluorescent light bulbs in the ceiling above my computer, pulled down the blinds on my window, and use two small lamps at my desk for noncomputer work. I've also moved my monitor so that its sides are parallel with the window, to minimize glare when the window blinds are open. (If the front or back of a monitor faces a window, the contrast ratio is pushed out of whack and visual stress goes up.) Experiment; sometimes turning off one or two overhead lights, instead of all of them, can be helpful. And if the overhead lights must stay on, Sheedy suggests the best solution may be wearing a baseball cap.

I also use an antiglare screen. Computer hoods are available to shield screens from glare, but Sheedy doesn't recommend them. A "hood only protects the screen from the light coming straight down on

continues



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appropriate
lighting
and plenty of
breaks*

it, whereas an antireflection filter protects the screen from light coming from any orientation," he says. Mesh screens are also a no-no because they degrade screen resolution. The experts I spoke to recommended using optically coated filters instead. Several companies make optically coated antiglare screens for Mac models, including OCLI, Kensington, Curtis, and Polaroid.

Vision-Clear, a polymer spray developed in Australia, may eventually rival antiglare screens in popularity. It's expected to be on the market by April and sold by a Whitehouse Station, New Jersey, company called Proformix to service providers. Technicians will visit sites to apply the spray directly to computer screens for about \$50 per display. The advantage of the spray, according to Hedge, is that it should actually enhance contrast as it dispels glare, unlike antiglare screens, which can diminish overall contrast.

Of Lighting and Resolution

ONE EFFECTIVE—AND EXPENSIVE—APPROACH to office glare and resulting eye-strain is lensed indirect uplighting, according to Hedge. In 1988, a Xerox office building in upstate New York was renovated, with standard colors, furniture, and

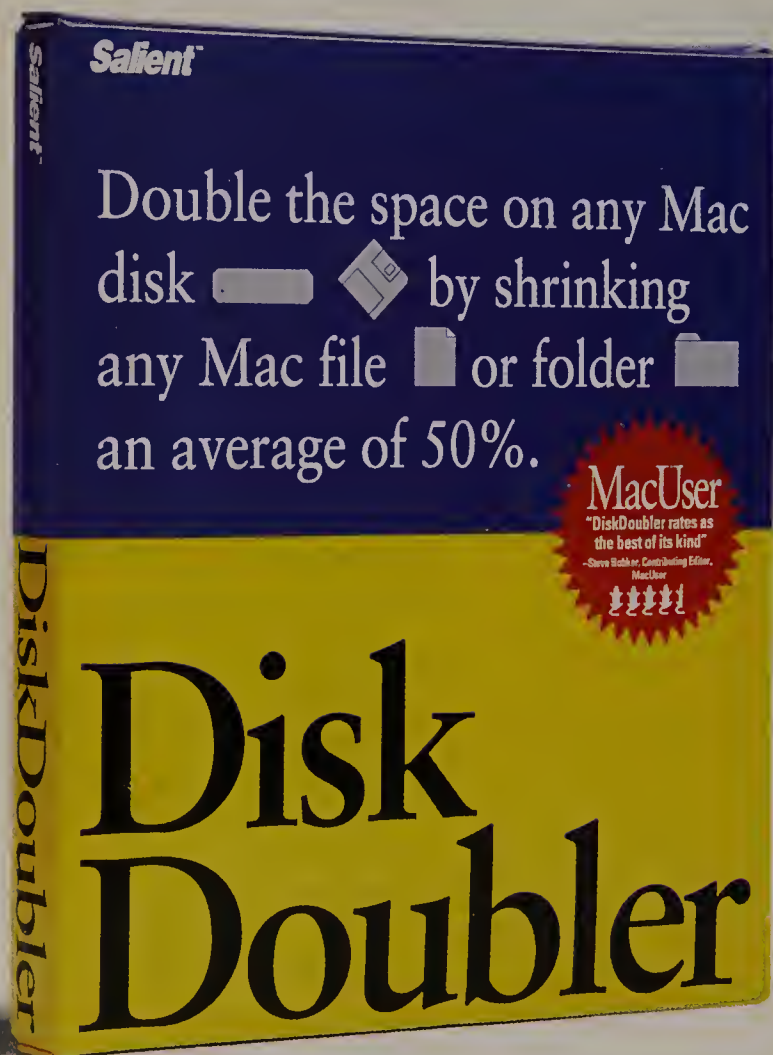
carpeting used throughout the building. About half the office was fitted with standard ceiling fixtures that aim light down; the other half used lensed indirect uplighting that hung from the ceiling and pointed toward the ceiling. The roughly 120 office workers involved in the study were not aware that it concentrated on lighting. First at 3 months after renovation, and then at 15 months, Hedge and his researchers found fewer and less-frequent eye-focusing problems and fewer complaints about lighting conditions among workers with the lensed indirect uplighting. Those with the standard lighting reported more vision complaints and, most telling, nearly half the standard lighting fixtures had been modified by users.

According to Hedge, the lensed indirect uplighting system works pretty well because it creates a lighting environment that gives sufficient reflected light for documents, yet isn't so bright that it causes glare on the screen or reduces contrast. That's the good news. The bad news is that it's about 20 percent more expensive than standard lighting fixtures and it's patented, so it's available from only one company, the Peerless Lighting Corporation of Berkeley, California. (The company paid for the Xerox lighting study, but

Hedge insists the company's sponsorship did not affect the results of the survey.)

More is better when it comes to text and dot density, according to Sheedy, who recently completed a study comparing reading speeds using PC-based systems with two separate displays. The text on each monitor was the same physical size, but one monitor had 73-by-80-dots-per-inch resolution while the other had 120-by-120-dpi resolution. The result? "People read significantly more lines with a higher-resolution display—17 percent more lines in a half-hour reading session," says Sheedy, who also found significantly fewer visual symptoms among the users of the higher-resolution display.

Unfortunately, Mac users can't benefit from this finding because Macs support 72-dpi resolution—period. Multi-resolution monitors that offer up to 120 dpi do it by shrinking the pixel size and putting pixels closer together. As a result, the text may look smoother because it's smaller. But text that is the same physical size on screen looks identical on a 72-dpi Mac monitor and a 120-dpi Mac monitor. That's a shame, because red-eyed Mac users deserve some relief in the form of cleaner, denser text. Until then, consider a black-and-white display; it's crisper and



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Service Hero

Les Clark of Edwardsville, Illinois, is a happy camper. Three years ago he received a ScanCo MacTable and cabinet as Christmas presents. He was pleased with both until recently, when the cabinet drawers started slipping off their slides, which were broken. Clark called ScanCo, which promptly mailed him a new set of slides at no cost. They arrived three days later and solved the problem.

ity in the musculoskeletal system as well as the visual system," he says. Regular and deep breathing is important to help fight fatigue, according to Godnig. And regular blinking reduces the chance of developing irritated, dry eyes. Another tip is viewing your monitor at a 10- to 20-degree downward angle—Sheedy's research found that angle was most comfortable and efficient for his test subjects.

A must for serious computer users is an annual exam by someone knowledgeable about the visual challenges of computer work. It's no joke—some vision specialists don't understand or accept the impact long-term computer use can have on eyesight. Sheedy's VDT Eye Clinic has pioneered techniques for assessing computer-related vision problems. Clinic patients receive questionnaires before their visits that ask them to measure and describe their work environment. "We actually want them to get out a meterstick, for example, and measure the height of the chair, the height of the keyboard, the eye-screen viewing distance, the location of the reference documents, and make observations about the screen, its color, its contrast polarity," says Sheedy. After a thorough eye exam, patients are taken to a VDT-simulation room where a worksta-

tion is adjusted to match the measurements they brought in. There, clinic doctors make final decisions about prescriptions and counsel patients on workstation arrangement, lighting, wrist supports, and overall posture.

Besides workstation or lighting changes, eye specialists may recommend a new lens prescription, special computer glasses, or eye exercises to improve a patient's visual skills. Beware of so-called experts who say every computer user needs special glasses—they are not a cure-all.

For more information, try *Computers & Visual Stress* by Edward Godnig and John Hacunda. The slim, \$12.95 book is available from Seacost Information Services at 401/364-6419. It includes preventive eye-care exercises, a VDT questionnaire to discuss with eye-care specialists, and a directory of vision and safety-related organizations. UC Berkeley's VDT Eye Clinic is at 510/642-1399. **m**

thus kinder to vision than its color counterpart. And sans serif type, according to Hedge, is easier on the eye on screen and in presentations, if not on the printed page.

Preventive Care

GODNIG RECOMMENDS THE THREE B's—breaks, breathing, and blinking—to help prevent eye problems. He recommends 10-minute breaks every hour for full-time computer users. For those with less-demanding computer schedules, he suggests a 15-minute break every two hours. "I think it's good to get up, get around, start moving, keep some flexibil-

Research assistance by CAROLYN BICKFORD.

Send nominees for sainthood to *Service Heroes*, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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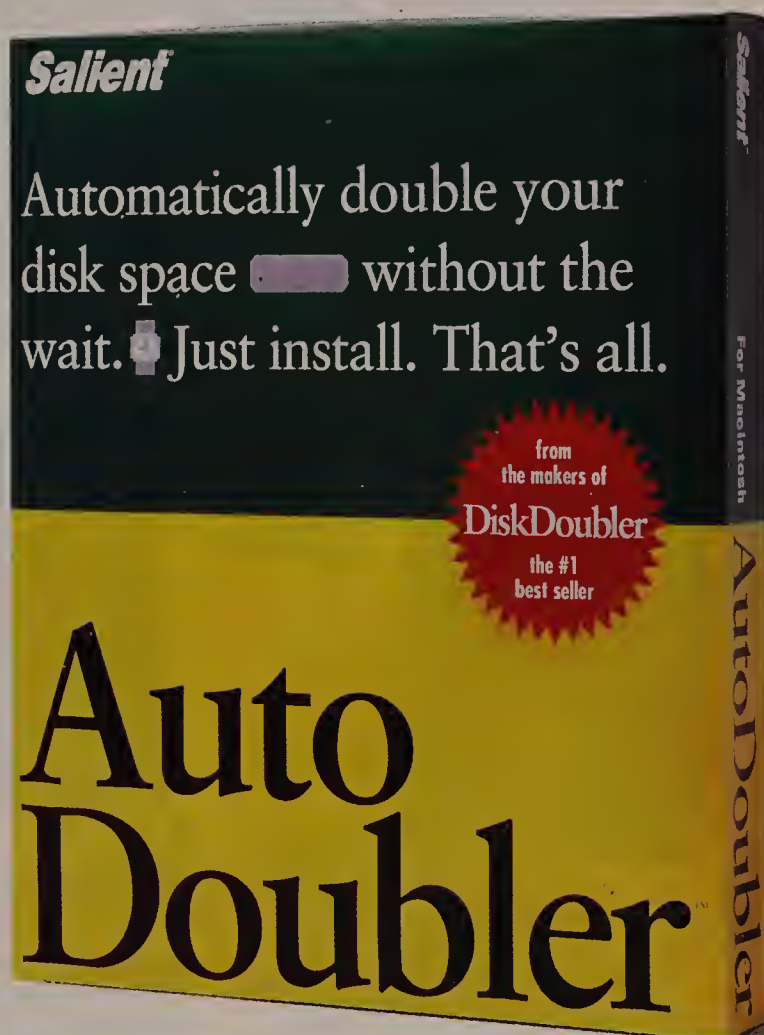
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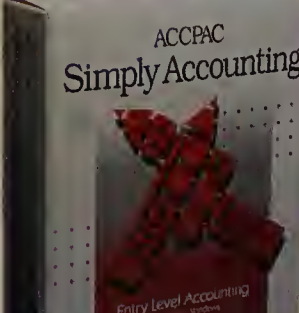
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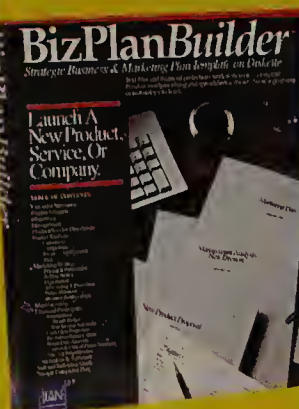
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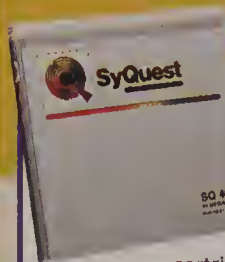
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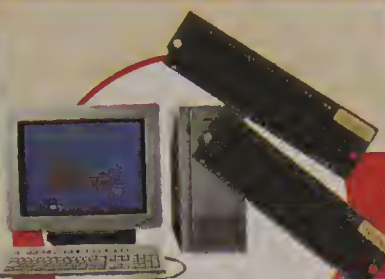
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Aldus FreeHand 3.1 has the design and illustration tools to make your job easier. It offers more control over text than before, including text on a path, vertical text, and the ability to convert characters into editable outlines. Aldus Corp. 0333 ✓ #

GRAPHICS

Adobe Systems

4670 Adobe Premier	308	
4983 Adobe Illustrator 3.2 with ATM	369	✓
3971 Streamline 2.0	121	✓

Aldus Corp.

4121 Aldus Gallery Effects	128	✓
3947 Aldus Freehand 3.1	394	✓
4190 Aldus Superpaint 3.0	132	✓
1379 Super 3D 2.5 (Color)	328	✓

Broderbund

4347 Typestyler 2.0 With ATM	127	✓
3970 Banner Mania-Mac	34	✓

Claris

2201 Macpaint 2.0	88	✓
4073 Macdraw Pro	278	✓

Delta Tao Software

4082 Monet	249	✓
4070 Color Mac Cheese	64	✓

Deneba

0803 Canvas 3.0	248	✓
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Electronic Arts

3594 Studio 32	448	✓
3827 Studio 8 2.0	188	✓

Fractal Design

4460 Fractal Design Painter	249	✓
3216 Colorstudio	598	✓

Multi-Ad Services, Inc.

0054 Multi-Ad Search	115	✓
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Pantone Matching Grid

4056 Pantone Color System Guide	54	✓
3435 Pantone Color Imaging Guide	54	✓

Paracomp/MacroMind

4808 Swivelman 3D Pro 2.0	529	✓
3619 Swivel 3D Professional	434	✓

Postcraft International

4049 Effects Specialist	94	✓
Layouts - Stationary Pack A or B	34	✓

Raydream

4801 Raydream Designer 2.0	619	✓
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Strata

4088 Stratavision 3D 2.0	515	✓
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Supernac Technology

1576 Pixelpaint 2.1	148	✓
2665 Pixelpaint Pro 2.0	489	✓



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Prescience #1382 ✓

FONTS & CLIP ART

3G Graphics

2085 Images w/ Impact-Business 1	64	✓
1617 Images w/ Imp.-Graphics & Symbols 49		✓

Adobe Systems

Adobe Font Library- Full Line	Call	✓
3235 Adobe Collectors Edition #2 P&T	139	✓
3234 Adobe Collectors Ed #1 S&B	79	✓
3950 Type on Call CD-ROM	58	✓

Agfa

4954 Agfa CD-ROM Subscription Club	569	✓
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Cassidy And Greene

0315 Fluent Laser Font 4.0 w/ True Type	98	✓
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D-Pix Visual Velocity

4823 Folio I	349	✓
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Dream Maker Software

4000 Cliptures Vol 1, 2, 3, or 4	67	✓
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Fontbank Inc.

4986 Fontbank Type Companion	94	✓
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Monotype Typography

0878 Monotype Imprints Library	22	✓
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T Maker

Click Art Series	31	✓
0456 Clickart EPS Series	82	✓

Uncle Mitty's Clip Art

4273 Uncle Mitty's Clipart	34	✓
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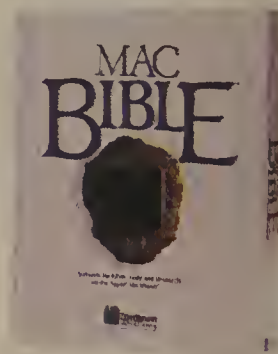
Expert Color Paint

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Softsync Inc.#0954 ✓



MacBible New International Version



\$78

MacBible presents several different versions of the Bible to help you understand its meaning more clearly. It quickly finds the passage you want. Zondervan Electronic, Inc. #0016 ✓ #

King James #0017	\$78
RSV #0018	\$78
Greek Version #0021	\$109
Hebrew Version #0023	\$109

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WORD

Microsoft Word 5.0

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Microsoft Word makes every day easy. The ribbon feature lets you perform common tasks with a single mouse click. And a wealth of other helpful tools make it easier than ever to create everything from simple memos to newsletters to manuscripts. Microsoft Corp. #4898 ✓✓



Optifont

\$599

Optifont is a unique selection of 400 designer typesets which includes text type (both serif and sans serif), decorative, victorian, art nouveau, inline, outline and shadow. Castcraft Software ✓✓ #0345

Microsoft Excel 3.0

\$298

The most advanced spreadsheet for the Mac! Microsoft Excel combines spreadsheet with business graphics and a database. Presentation tools like multiple fonts, variable row heights, shading, custom number formats, 68 built-in chart types and more, make Microsoft Excel the ultimate business tool. Transfer Excel charts and worksheets into Word.

Microsoft Corp. #0227 ✓✓



PERSONAL PRODUCTIVITY

After Hours Software

3908 Touch Base 2.0 78 ✓✓

Attain

4949 In Control 89 ✓✓

Ce Software

3624 Alarming Events 83 ✓✓

1497 Calendar Maker 3.0 30 ✓✓

Claris

4140 Macproject II V2.5 348 ✓✓

4302 Hypercard 2.1 Development Kit 138 ✓✓

4814 Hypercard Upgrade 2.0 to 2.1 49 ✓✓

Fisher Idea Systems, Inc.

0897 Idea Fisher 2.0 387 ✓✓

Jian Tools

4257 Biz Plan Builder 93 ✓✓

4996 Livingtrustbuilder 99 ✓✓

Mainstay

3089 Macschedule V2.5 144 ✓✓

Microsoft Corporation

4161 Project for the Mac 448 ✓✓

Nolo Press

0481 Will Maker 4.0 Mac 31 ✓✓

3781 For The Record 2.0 Mac 31 ✓✓

4720 Living Trust 84 ✓✓

On Technology

4009 Meeting Maker 5 User 314 ✓✓

4123 Meeting Maker 10 User Pack 548 ✓✓

The Open University

4671 The Desktop Lawyer Mac 69 ✓

Pastel Development

4752 Daymaker 64 ✓

Portfolio Systems

Dynopage or Dynodex 2.0 71 ✓✓

3978 Dynodex Paper (300 Pages) 14 ✓✓

Power Up

0115 Address Book Plus V2.0 62 ✓✓

3631 Calendar Creator Mac 42 ✓✓

1521 Fast Forms 2.0 109 ✓✓

Superoffice Corp

4966 Super Office Single User 249 ✓

Wordperfect Corporation

4170 Wordperfect Office 3.01 92 ✓✓

Working Software

4061 Last Resort 1.0 34 ✓✓

Living Trust

\$84

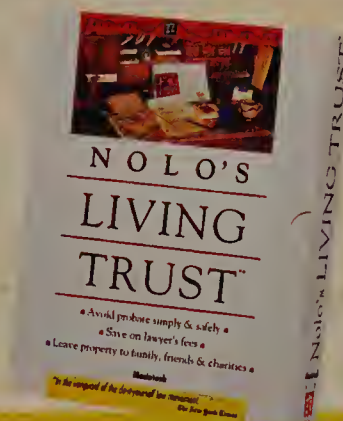
Make sure that your wishes are followed. Write your own living trust! Easy-to-use question and answer format walks you through the process step by step. Use it for individually or jointly-owned property. Can be rewritten or modified any time you wish. Nolo Press #4720 ✓✓



TouchBASE 2.0

\$78

Guy Kawasaki calls TouchBASE the most functional piece of Macintosh software he has ever seen. TouchBASE is a database which keeps track of personal and business contacts. It remains handy all the time—no matter what application you are using. After Hours Software #3908 ✓✓

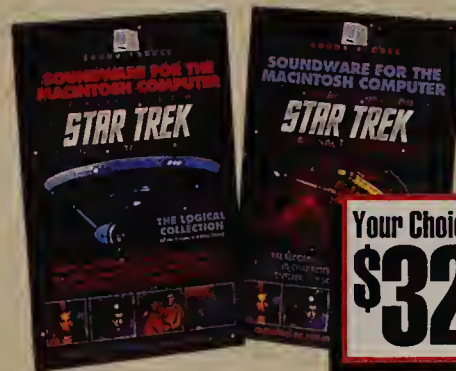


German Pronunciation

\$34



Learn German from your computer! Pronunciation is like having your own private language coach. The digitized voices of native German speakers teach you proper diction. HyperGlot Software Co., Inc. #3746 ✓✓



Star Trek Sounds

The ultimate sound effects for your Macintosh (Paramount-authorized). Simply install in your system folder. The sounds are preconfigured to play your favorite Star Trek segments. Also can be used to energize your multimedia presentations. Sound Source Vol.I #4672, Vol.II #4687

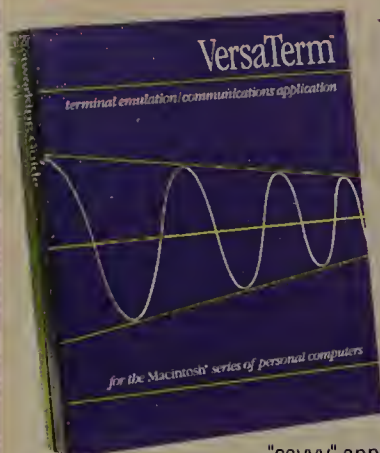
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VersaTerm 4.5

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VersaTerm offers DEC VT100, VT220 test emulations, and Tektronix 4010/4012/4014 graphics emulations. A system 7.0 "savvy" application which supports Apple Events and the Edition Manager's Publisher, VersaTerm comes with a complete set of tools and INIT's. Synergy Business Solutions, Inc. #0643 ✓



Tele Port/ Full Fax

\$218

This compact 9600 baud fax plugs into the ADB port like a mouse, leaving your serial port available for other uses. Also runs without an additional power cord. And built in phone/fax switches. Global Village Communication, Inc. #0949 ✓

VersTerm Pro 3.5 #0198 \$169



Drive 7 & DriveShare

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You'll say goodbye to System 7 hard drive formatting incompatibilities forever with the Drive 7 Universal Formatter. Now you can share a Syquest or optical drive under file sharing. Drive Share makes mixed system environments work! Low price includes a 5-user license. Casa Blanca #0953 ✓



PowerBook Home Office

\$269



Turn your Mac into a complete communications system! Home Office adds voice to a combination data/fax modem and turns your computer into a fully-featured answering machine. Plus, with its ability to detect whether incoming calls are fax, voice or data, it also functions as a line switching device. Prometheus #0331

MODEMS

Abaton Technology Corp	
2987 Abaton 24/96 Faxmodem 110V	338 ✓
Applied Engineering	
3980 Mac LC 24/96 Sendfax Modem	245 ✓
4579 Datalink LC V.42 Fax/Modem	259 ✓
Dove Computer Corp	
3318 Dove Fax 24/96	294 ✓
3514 Dove Fax Plus	358 ✓
4756 Dove Fax Lan External	499 ✓
Global Village Communica	
3883 Teleport Adb 2400 MNP 5 Modem ..	128 ✓
949 Teleport FullFax	218 ✓
Logicode Technology	
4644 Xeba 9600S/R Fax/V.42Bis	199 ✓
PSI Integration, Inc.	
4948 PSI Powermodem 24/96SR Intern. ..	215 ✓
Shiva	
1615 Shiva Netmodem V2400	338 ✓
3251 Shiva Netmodem V.32 9600	1149 ✓
4129 Shiva Netmodem/E 10 BaSE T	1749 ✓
Supra Corporation	
2003 Supra Modem 2400 Baud	89 ✓
4351 Supra Fax Modem Plus	199 ✓

UTILITIES

Berkeley Systems Design	
4046 More After Dark Bundle V.2	41 ✓
2785 After Dark 2.0U	28 ✓
Cassidy And Greene	
4761 Crash Barrier	49 ✓
Dantz	
4722 Disk Fit Pro	69 ✓
2586 Retrospect 1.3	146 ✓
Golden Triangle	
4724 Disktwin 2.0	699 ✓
861 Twinit	169 ✓
Microseeds Publishing	
2191 Init Picker 2.02	35 ✓
4807 Ham	56 ✓
Now Software, Inc.	
4191 Now Utilities 3.0	83 ✓
Salient	
4955 Auto Doubler	48 ✓
3515 Disk Doubler 3.7	46 ✓
Symantec	
4890 Norton Utilities 1.1.2	83 ✓
0116 Sam 3.0	65 ✓
Teknosys, Inc.	
0867 Help! 1.1	94 ✓

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MultiSync FG Monitors

Announcing the NEC FG series of MultiSync monitors. Completely redesigned from the inside out to give your Mac brighter, sharper, more accurate images. The FG series monitors features AccuColor Control System which provides unprecedented color accuracy. Now you can match on-screen colors to printer output, other monitors and reference systems such as Pantone. Advanced flat square screen technology gives you exceptionally sharp text and crisp graphics with edge-to-edge display for greater active screen area. Supports the entire Macintosh II family and the new Quadra 700 and 900 systems. #7399

MultiSync 5FG 17" with AccuColor #7399

\$1529



MultiSync 3FGx 15" #7144	\$698
MultiSync 4FGx 15" w/AccuColor #7143	\$794
MultiSync 6FGx 21" w/AccuColor #7182	\$3049

MacFG 24X Color Display Interface

\$1599

The new MacFG 24X Color Display Interface card. Has been designed to take full advantage of FG series monitors combined with the new NEC MacFG 24X. Quadra users can display 24-bit graphics in several display modes, including 1024x768 and 1152x870 dual-page mode. The 24X offers multiple display modes, allowing you to switch resolutions as easy as clicking your mouse. And to enhance the graphics performance of your system, the 24X offers added accelerating to the Mac II family and Quadra systems. NEC #4985

HARD DRIVES

Core International

4208 Core HC Mac 330 HD Ext	2195	✓
4209 Core HC Mac 650 HD Ext	2899	✓
4210 Core HC Mac 1000 HD Ext	3995	✓
4164 Core Optima 200	1249	✓
4165 Core Optima 80 Extern HD	599	✓
4166 Core Optima 120 Ext HD	749	✓
4649 Core Optical Disk (Rmc128-1)	89	✓

DPI

4881 DPI 105Mb Q Ext. Quantum	499	✓
4882 DPI 200Mb Q Ext. Quantum	849	✓
4884 DPI 415Mb Q Ext. Quantum	1799	✓
4451 DPI 45Mb Removable Syquest	549	✓
4880 DPI 52Mb Q Ext. Quantum	359	✓
4886 DPI 88 Removable Syquest	699	✓

Everex Systems

2161 EMac 150 Tape Backup Drive	715	✓ ✓
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FWB, Inc.

4891 FWB 200 Mb Pocket Hammer Ext .	1199	✓
0505 FWB Pockethammer 50 Mb HD	599	✓
0506 FWB 100 Mb Pocket Hammer Drive	799	✓
4964 FWB Hammerdisk 88Mb Removable	999	✓
4965 FWB Hammerdisk 44Mb Removable	729	✓

Generation Systems, Inc.

4589 45 Mb Remov. HD	549	✓
4691 88 Mb Remov. HD	799	✓

Iomega

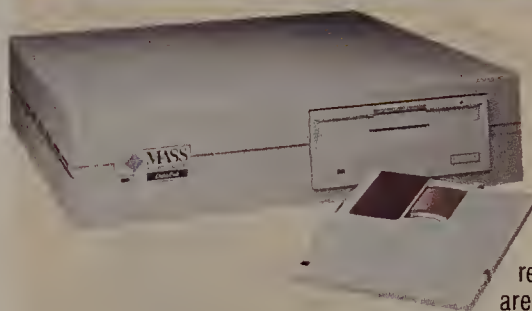
9728 Bernoulli Transport. 90Meg Dr.	799	✓
4052 Mac 1B Bernoulli Kit	38	✓

Mass Microsystems

899 Hitchhiker 40Mb	599	✓
4613 Diamond Drive 120-510 Mb	Call	✓
0164 Datapak MO 512 Meg Cartridge	208	✓
4062 Mass Micro Datapak 88 Remov.	839	✓
0175 Mass Micro DataPak 45 Remov.	649	✓

PLI

4818 1.2 GB FH Ext	2899	✓
4450 52Mb External Hard Drive	499	✓
3690 DAT Backup Sys. w/ Retrospect ...	2299	✓
2181 Infinity 40 Turbo HD Rem	649	✓
0214 Infinity 40 Turbo-220V	699	✓
2182 Infinity 40/40 Turbo HD	1199	✓
0182 Infinity 88 Turbo HD	799	✓
4817 Infinity Floptical 3.5 Ext	599	✓
0445 Q 105 Mb Ext. HD	698	✓
0446 Q 200 Mb Ext HD	849	✓
0811 Quick SCSI	372	✓



DataPack 128 3.5 MO Rewritable Optical Drive

\$1699

Because optical discs use a laser beam to read and write data, they do not wear out, and are not vulnerable to head crashes. The cartridges are interchangeable, so you can add extra capacity and transport large files. MASS Microsystems #0332 ✓ ✓

Infinity 88 Turbo #0182 \$799

Radius Color Pivot

\$1298

Now Uses
On-Board Video
with the
New Quadra



Color Pivot is the first full-page display for the Macintosh. And the only display that specializes in either portrait or landscape mode, and can also enable you to choose between full page (82 dpi) or actual size (72 dpi) resolution, and up to 256 colors on screen. Manufacturer's one-year warranty. Radius #4206 ✓ ✓

Radius Rocket Board

The Radius Rocket dramatically boosts your Macintosh application performance. It boosts both graphics and calculations up to 10 times faster! Radius #4207 ✓ ✓

\$1799

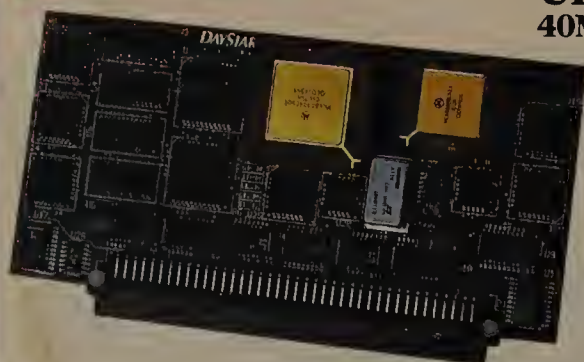
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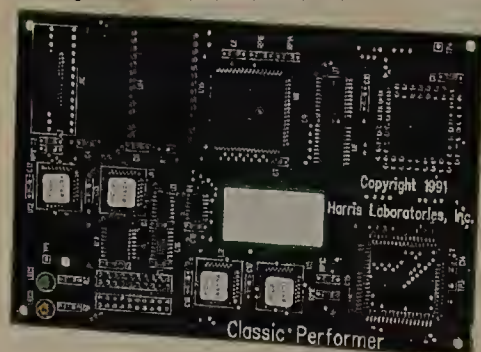


Here's the affordable way to get the maximum from your software. DayStar's proprietary technology combines a blazing fast 68030 processor with a superfast RAM cache. Now you can get '040 performance with proven '030 compatibility including system 7.0. Accelerates virtually every function in all applications. An optional math chip is a real time-saver for spreadsheet recalls and scientific tasks. The universal design makes it easily transportable to almost every Mac with cache adaptor including the SE/30, II, IIx, IIcx, LC, IIsi & IICI. DayStar Digital, Inc. #4320 ⑦ ✓

DAYSTAR

DayStar Digital

4183 Dual Port IIsi nout FPU	104	⑦ ✓
4549 Cache Adapter LC	0	⑦ ✓
4181 Fast Cache IIsi	309	⑦ ✓
4182 Dual Port IIsi with FPU	169	⑦ ✓
4319 Universal Powercache 40MHz	918	⑦ ✓
4320 Univ.Powercache 40MHz w/FPU	1139	⑦ ✓
4321 Universal Powercache 50 MHz	1429	⑦ ✓
4322 Univ.Powercache 50MHz w/FPU	1749	⑦ ✓
4323 Universal Powercache 33 MHz	698	⑦ ✓
4634 Univ.Powercache 33MHz w/FPU	979	⑦ ✓
4707 Cache Adapter IIsi	38	⑦ ✓
4708 Cache Adapter PDS (SE/30)	38	⑦ ✓
4709 Cache Adapter II	38	⑦ ✓
4710 Cache Adapter IIx	38	⑦ ✓
4711 Cache Adapter IIcx	38	⑦ ✓
3730 Ram Powercard without Simms	499	⑦ ✓
2877 Fast Cache IICI 64K Ram	278	⑦ ✓
3729 SCSI Powercard without Simms ...	1124	⑦ ✓



Classic Performer

\$249

The Classic Performer is designed to turn your Mac Classic into a serious business tool. It will

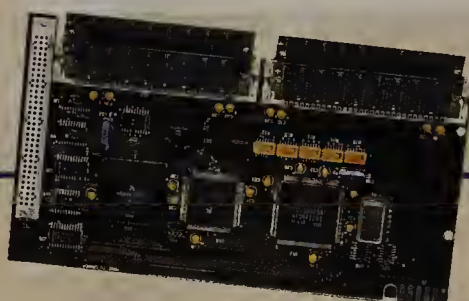
double the processing power, accerate program loading and increase file sorting. Harris Labs #4646 ⑦ ✓

Coprocessor for Classic Performer . #4647 ...74

ACCELERATORS

Memory Chips

1503 Tool Kit Mac with Grounding Strap	8	⑦ ✓
0848 8Mb Simms	499	⑦ ✓
0849 16Mb Simms	799	⑦ ✓
4943 256K Videout Ram-Quadra 2 Chips	109	⑦ ✓
1963 2 One Mb Simms (100Ns)	84	⑦ ✓
4608 LC Videout Ram-512K	89	⑦ ✓
0014 LC Simms (Twout 2Mb) 2X8X80	189	⑦ ✓
3584 Simms 4X4 for II/IIx Only	799	⑦ ✓
3976 Simms LC (Twout 4Mb Simms)	317	⑦ ✓
3583 Simm 4X4Mb SE/30,cx,ci,si,Quadra639	799	⑦ ✓
3936 IIsi Simm Module 2Mb (Qty 4)	389	⑦ ✓
3585 Simms 4X4Mb fx	759	⑦ ✓
3579 Simms 4X1Mb fx 80Ns fx/NTX	169	⑦ ✓
3586 Simms 1Mb NTX	49	⑦ ✓
3428 2 One Mb Simms (80Ns) Samsung ..	94	⑦ ✓
801 2 1Mb Simm(2Chip solu)ci,si,Classic89	799	⑦ ✓
7 Mac Port SRAM 1Mb	204	⑦ ✓



NewLife 16 MHz

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Do the demands of the latest applications and system software tax your Classic? New Life has the solution. Nominated for an Eddy Award, the New Life 16 MHz w/ FPU (Classic) improves real

performance and offers features such as: System 7 compatibility, 68030 power and speed, optional 68882 FPU, optional video adapter, and burst mode capacity of and 030. #4947 NewLife Computer Corp. #4947 ⑦ ✓

⑦ = System 7 Compatible ✓ = Money Back Guarantee

Applied Engineering

873 TransWarp 040	2189	⑦ ✓
4072 Cache In 50 with FPU	1899	⑦ ✓
4732 TransWarp LC 33MHz with FPU	999	⑦ ✓
4325 TransWarp SE Accel 25MHz w/FPU	799	⑦ ✓
4735 TransWarp SE 40 MHz w/FPU	1499	⑦ ✓
4154 Quicksilver IIsi w/FPU	299	⑦ ✓
0833 Quicksilver IIsi Cache Card	269	⑦ ✓
3673 Quadralink	208	⑦ ✓
0289 Cache-In (IIsi Cache Card)	194	⑦ ✓
4904 Fastmath Classic II	169	⑦ ✓
4120 Fast Math LC	139	⑦ ✓
3824 Macram Classic 1Mb Upgrade AE	88	⑦ ✓

Dove Computer

3818 Macsnap 512Ke-4Mb w/SCSI	455	⑦ ✓
1260 SCSI Port Adapter Macsnap	99	⑦ ✓
0964 Macsnap 512Ke-1Mb w/SCSI	248	⑦ ✓

Harris Laboratories, Inc.

4646 Classic Performer	249	⑦ ✓
4647 68881 Math Coprocessor Upgrade ...	74	⑦ ✓

NewLife Computer Corporation

4914 16MHz no FPU Plus&512E	499	⑦ ✓
4915 16MHz with FPU Plus &512E	579	⑦ ✓
4917 SCSI for 128K,512K,512Ke	98	⑦ ✓
4918 16MHz with FPU (SE)	479	⑦ ✓
4919 16MHz no FPU (SE)	399	⑦ ✓
4920 25MHz with FPU (SE)	819	⑦ ✓
4922 33MHz with FPU (SE)	1789	⑦ ✓
4923 25MHz with FPU (Plus&512E)	839	⑦ ✓
4925 16MHz FPU&Video Plus&512	719	⑦ ✓
4926 SE Video Adapter for Radius FPD ...	289	⑦ ✓
4927 Mono Video Adapter Port Classic ...	254	⑦ ✓
4947 16MHz with FPU-Classical	569	⑦ ✓
4952 16MHz with out FPU-Classical	489	⑦ ✓

PLI

0811 PLI Quick SCSI	372	⑦ ✓
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Radius

4207 Radius Rocket	1799	⑦ ✓
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Sigma Designs

4220 Bullet 030 50MHz with Double Up ..	1399	✓
0215 Sigma Double-Up Board	149	⑦ ✓

Technology Works

4906 Powerbook 100 4Mb SRAM	469	⑦ ✓
4907 Powerbook 2Mb SRAM100,140,170269	⑦ ✓	
4908 Powerbook 100 6Mb SRAM	649	⑦ ✓
4987 Powerbook 140, 170 6Mb SRAM ...	649	⑦ ✓
4988 Powerbook 140, 170 4Mb SRAM ...	469	⑦ ✓
4905 1 Mb Memory Upgrade TI Ps-17	69	⑦ ✓

Texas Instruments

4665 1Mb Mem Upgr TI Ps17	239	⑦ ✓
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Sigma Bullet

\$1399



Get a full system upgrade in a single card. The Sigma Bullet 030 increases both the CPU speed, and effective disk speed and capacity of your Mac IIsi or ci. And it is 100% compatible with all standard Mac software. Sigma Designs #4220

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We Keep You In Touch So You Can Stay On Top!



Star Controller En Pn 357

Manage and expand your network easier than ever. Star Controller hub's patented circuitry amplifies LocalTalk signals up to 1M bps. With StarCommand V3.0 software manages your StarController hubs from any Mac computer on their network. Farallon Computing, Inc.#4738

\$1024

NETWORKING

Asante

4933	Maccon 3 IIsi	249	✓
0510	Maccon 3 SE	249	✓
0894	Hub 8	264	✓
0511	Maccon 3 Nubus 64K	249	✓
4334	Maccon+ 30 I ET MC	299	✓
0327	EN/SC SCSI Ethernet	339	✓
4184	Maccon+ 30 I ET MC64	249	✓
3646	Maccon+ 30 I ET	199	✓
0221	Maccon+Ile with 64K Ram	259	✓
0029	Maccon+ LC/EN 10 Base T	249	✓
0820	Maccon+ 30 IE MC 64	359	✓
3885	10 Base T Hub	548	✓
3647	Maccon+30le 64	269	✓
0228	Maccon+ 30 IET 64	259	✓
0020	Maccon+ 30 IE	200	✓
3641	Maccon+ II E EN	199	✓
3642	Maccon+ II ET 64K Ram	254	✓
3945	10T MAU	99	✓

Cayman Systems

0181	Gator Box Cs	1899	✓
3117	Gator Card E/II (II Series) En	328	✓

Dayna Communications Inc

4911	DaynaStar Minihub	308	✓
0806	DaynaPort E/LC	179	✓
4297	Dayna DI2000 Single User	215	✓
4595	DaynaPort E/II-T	179	✓
4717	DaynaPort E/30	179	✓
4718	DaynaPort E/II	179	✓
4139	DaynaPort E/Z T	264	✓
0805	DaynaPort E/Si	179	✓
0804	DaynaPort E/Z	330	✓
0321	EtherPrint Plus 4 Devices	599	✓
0322	EtherPrint-T Plus 4 Devices	619	✓
3546	Dayna Etherport/Local Talk	349	✓
0003	Dayna Etherprint 10BaseT	349	✓

Farallon

4885	Timbaktu Power Pack	199	✓
4307	Phone Net StarConnector PN502	104	✓
4738	12 Port Starcontroller PN357	1024	✓
4739	24 Port Starcontroller PN377-1	1298	✓
0352	Phonenet Talk Appleshare	124	✓
0353	Phonenet Card Pc LocalTalk PN380	208	✓
0829	StarController 300 Ser. PN307	886	✓
3333	StarController En PN 507	1358	✓
3475	StarConnector En PN 501	102	✓

GDT Software Inc.

0901	Betterwriter V1.0.1	38	✓
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Nuvotech (Bay Bus. Cred)

2184	Turbo Bridge	318	✓
4067	Nurolink II-T En 10 Base T	189	✓
3119	Nurolink II	189	✓
0284	Nurolink SC-T	358	✓
3115	Nurolink SC	388	✓
3121	Turbo Star (Nuvotech)	815	✓

Shiva

4038	Shiva Fast Path V Thick/Thin	1899	✓
2700	Etherport II	188	✓
2542	Shiva Telebridge	408	✓
1406	Shiva Netserial	274	✓
1405	Shiva Netbridge	408	✓
2985	Ethergate	1295	✓

Tops

4715	Tops Repeater 2.0	118	✓
1677	Tops Flashcard (Dos)	149	✓

Timbaktu V4.0 Single User #0420 ...\$129

StarController 300 Series #0829\$824

PhoneNet Card PC LocalTalk #0353 ...\$208

PhoneNet-Din-8 #0832\$31



PhoneNET Card for Ethernet

PhoneNET Card EN Mac II designed for easy installation and direct trouble-shooting, the PhoneNET Card for Ethernet comes with RJ-45 and thick Ethernet connections, so you can connect directly to your twisted pair network. Farallon Computing, Inc. #0139 ✓✓

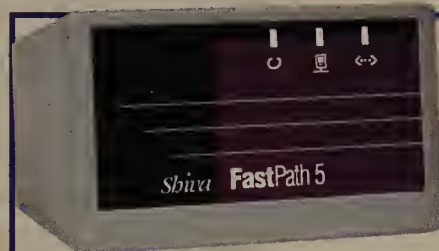
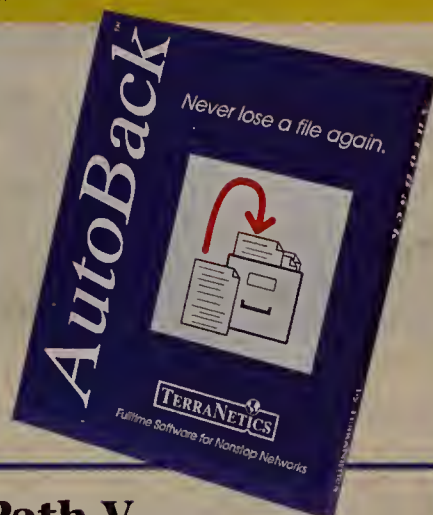
\$174

AutoBack

\$94

AutoBack, the full-time automatic file backup utility for Macs, takes care of backup for you. It maintains an up-to-date shadow copy of files and folders on any Mac-compatible disk or file server with no user intervention required and no down time. TerraNetics #0863 ✓✓

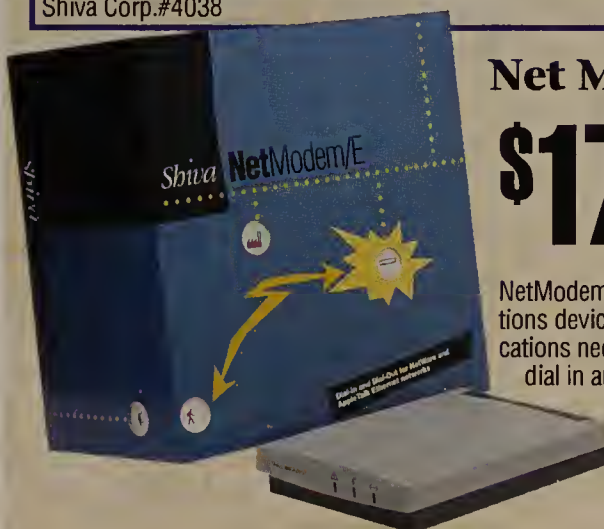
Safe Deposit #0343\$449



Fast Path V

\$1899

FastPath V gateway allows Macintoshes on a LocalTalk network to access Ethernet network systems and services AND Ethernet-based machines to access AppleTalk on a LocalTalk network. *Everyone* has company-wide access to printing, electronic mail and file servers wherever they're located. Shiva Corp.#4038



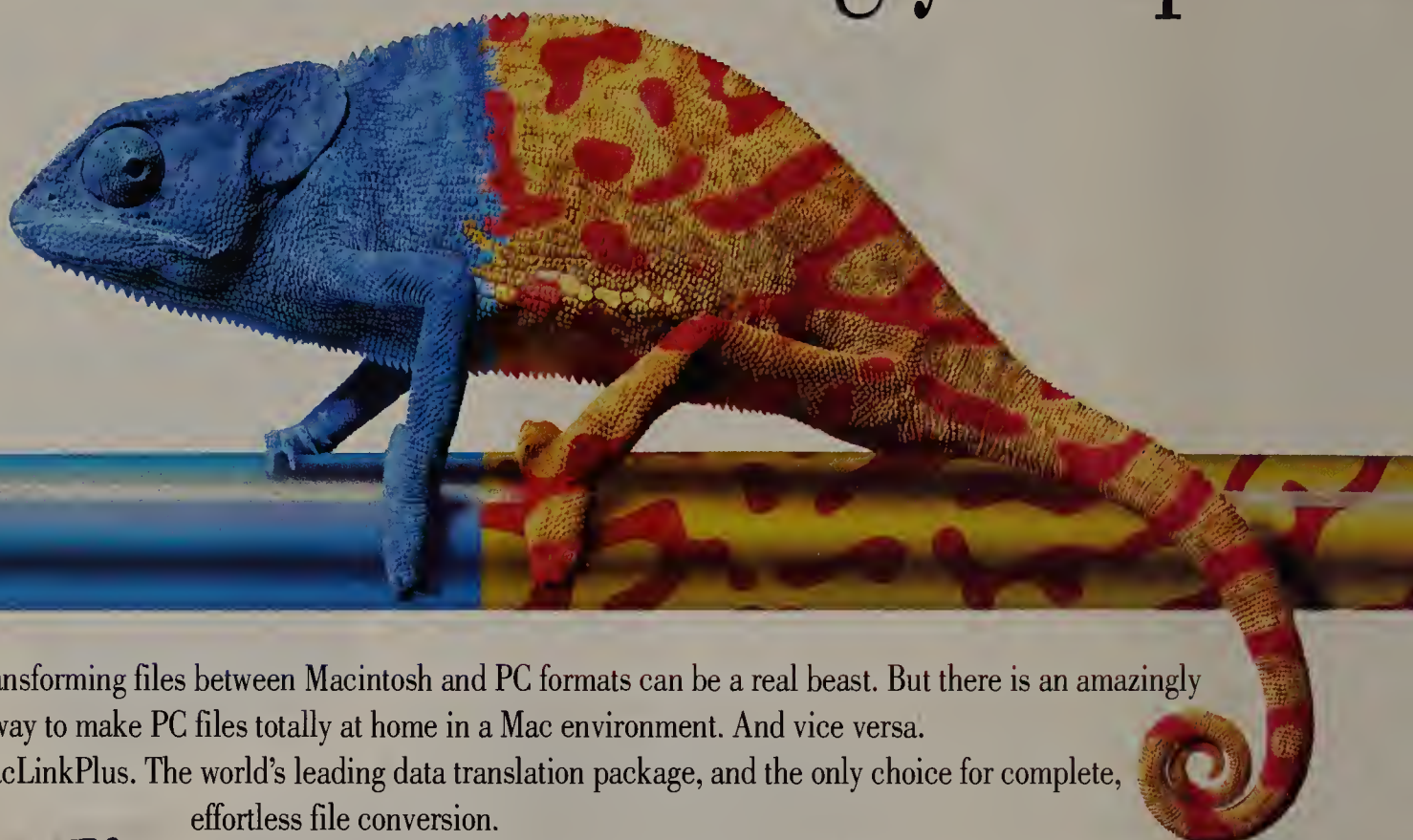
Net Modem/E

\$1749

NetModem E is a stand-alone Ethernet communications device designed to meet three LAN communications needs: 1) It allows remote workstations to dial in and have full access to network services; 2) It lets LAN workstations call out to remote information services or hosts; 3) It joins geographically separated networks via a routing connection over ordinary phone lines. Shiva Corp. #4129 ✓✓

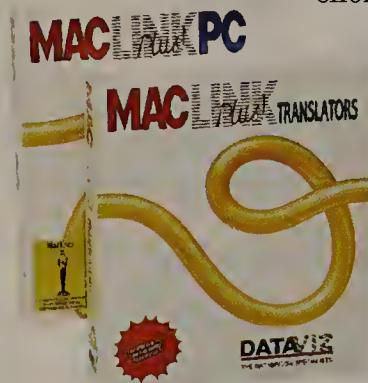


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Circle 36 on reader service card

Updates

APRIL 1992

THIS SECTION LISTS THE LATEST VERSIONS OF SELECTED MAC APPLICATIONS THAT WERE ANNOUNCED BY THE TIME WE WENT TO PRESS.

PRODUCT	V.	REQ.	★	\$
4TH DIMENSION	2.2	1MB/6.0		\$99
A4	3.0	2MB/6.0.5		\$395
AATRIX CHECKWRITER II	3.02	512K/4.1	*	
ACCOUNTANT, INC. PROFESSIONAL	3.0	1MB/6.0.3	*	
ACCUTEXT	3.0	4MB/6.0		\$150
ACTA 7	7.0	512KE/6.0.5	2/92	\$33.50
ADDMOTION	2.0	2MB/6.0.5	*	
ADDRESS BOOK PLUS	2.0	1MB/6.0.2	2/92	\$25
ADOBE ILLUSTRATOR	3.2	2MB/6.0.3	*	
ADOBE PHOTOSHOP	2.0	2MB/6.0.2	9/91	\$199
ADOBE TYPE MANAGER	2.0	1MB/6.0.2		FREE
AFTER DARK	2.0	512KE/4.1	5/91	*
AGENT DA	2.0	1MB/6.0.5		\$30
AGFATYPE	3.0	2MB/6.0.2		FREE
AGFA TYPECHART	1.5	1MB/6.0.4	7/91	FREE
ALARMING EVENTS	1.0.3	1MB/6.0.2	11/91	\$15
ALDUS DIGITAL DARKROOM	2.0	1MB/6.0	9/91	*
ALDUS FREEHAND	3.1	1MB/6.0.5	8/91	*
ALDUS PAGEMAKER	4.2	4MB/6.0.5	*	
ALDUS PERSUASION	2.0	1MB/6.0.5	*	
ALDUS SUPER 3D	2.5	2MB/6.0.5	*	
ALDUS SUPERCARD	1.6	2MB/6.0.4		\$50
ALDUS SUPERPAINT	3.0	1MB/6.0.5	3/92	\$65
ALLIANCE POWER TOOLS	2	1MB/6.0.4	*	
AMAZING PAINT	1.0.1	512KE/6.0.4		\$15
AME	2.0	1MB/6.0.2	5/91	\$49.95
ANTITOXIN	1.4	512K/3.2		\$15
APPLESHARE FILE SERVER	2.0	512K/3.2	*	
ARCHICAD	4.0	5MB/6.0	10% OF LIST	
ASHLAR VELLUM	2.10	4MB/6.0.2	*	
ASHLAR VELLUM 3D	2.10	4MB/6.0.2	*	
ATONCE	1.2	1MB/6.0.5	*	
AUDIOMEDIA	2.02	2MB/6.0.7		\$29
AURACAD	3.01	1MB/4.0		\$90
AUTHORWARE PRO	1.7	2MB/6.0.5	*	
AUTOSAVE II	2.0	512KE/4.2	*	
A/UX	2.0	4MB/6.0.5	*	
AZIMUTH	2.0	1MB/6.0.2	2/92	\$45

PRODUCT	V.	REQ.	★	\$
BACKFAX	2.0	1MB/6.0.3		\$75
BACKMATIC	2.0	1MB/4.2	2/92	*
BILL-IT	2.6	1MB/6.0.3	*	
BITSTREAM TYPEFACE LIBRARY	1.5	1MB/6.0	*	
BUSINESS SENSE	1.5	1MB/6.0.7		\$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0	*	
CALENDAR	1.1.2	512KE/6.0	11/91	FREE
CANOPENER	2.0	512K/3.0		\$29
CANVAS	3.0	1MB/6.0.2	1/92	*
CAPTURE	4.0	12BK/4.1		\$30
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.1	1MB/6.0	*	
CHECKLIST	2.0	1MB/6.0	2/92	*
CINEMATION	1.0	4MB/6.07		NA
CLARIS CAD	2.0.2	2MB/6.0		\$79
CLARIS RESOLVE	1.0.1	1MB/6.0.5	1/92	NA
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1MB/6.0.4		\$5
CLICKPASTE	2.1	1MB/6.0	*	
CMS UTILITIES	7.0	2MB/7.0		\$25
COLOR MACCHEESE	2.07	1MB/6.0.5		\$15
COLORSTUDIO	1.5	4MB/6.0.5	3/92	*
COMPUSERVE INFORMATION MANAGER	1.5	1MB/4.1	*	
COMPUSERVE NAVIGATOR	3.0.4	512K/4.1	*	
CONCERTWARE+	4.0	512KE/4.2		\$15
CONNECTIONS	2.0	2MB/6.0.5	4/92	NA
CORRECT GRAMMAR	2.0	1MB/4.2	*	
DATA CLUB CLASSIC	2.0	2MB/6.0	*	
DATA SHAPER	1.2	1MB/6.0		\$40
DECK	1.03	2MB/6.0.7		FREE
DELTA GRAPH PRO	1.0	2MB/6.0.5		\$75
DELUXEMUSIC CONSTRUCTION SET	2.5	512K/6.0.2	*	
DESCARTES	1.04	2MB/6.0.3	6/91	FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0	*	
DESIGNCAD	3.0	2MB/6.0.5	*	
DESIGNCAD 2D/3D	3.0	2MB/6.0.5		\$50
DESIGNSTUDIO	2.0	1MB/6.0	11/91	*
DESKPAINT	3.07	1MB/6.0.5		\$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4		\$80
DISKDOUBLER	3.7	1MB/6.0.2	3/92	\$15
DISKEXPRESS II	2.07	1MB/6.0	*	
DISKFIT PRO	1.0	1MB/6.0	4/92	\$32.50
DISKTOP	4.01	1MB/6.0	*	

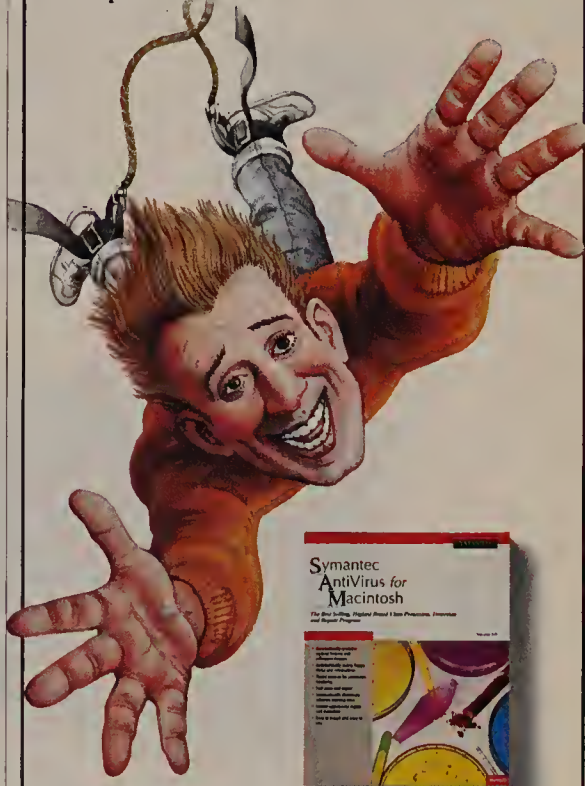
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V. = version #. Req. = min. RAM and system software required. ★ = last time (in the past year) this or an earlier version was reviewed. \$ = cost of update to registered owners. NA = first version, not applicable. * = contact your dealer for update policy. Blue = new version. Yellow = reviewed product.

PRODUCT	V.	REQ.	*	S
DISPLAY ADBUILDER	1.1	1MB/6.0.3	*	
DOLLARS & SENSE	5.0	512KE/3.2	*	
DOUBLE HELIX	3.5	1MB/6.0	\$99	
DREAMS	1.1	1MB/6.0.2	4*	
DYNAPERSPECTIVE	2.3	2MB/6.0.5	\$149	
DYNODEX	2.0	1MB/6.0	2/92	\$25
EASY COLOR PAINT	2.02	1MB/6.0.2	*	
EHELP	2.0	1MB/4.1	\$445	
EMPOWER II	4.0.7	2MB/4.2	*	
ENCORE	2.0.7	2MB/6.0.2	*	
ENHANCE	2.0	2MB/6.0.3	11/91	\$50
EVOLVE	1.1	2MB/5.3	\$25	
EZ VISION	1.0	1MB/6.0.3	NA	
FASTBACK PLUS	2.6	1MB/6.0	4/92	*
FAST FORMS	2.0	1MB/6.0	\$25	
FASTLABEL	3.1	1MB/6.0	\$10	
FASTTRACK	1.5	512KE/5.5	\$20	
FAXGATE (MICROSOFT MAIL)	3.0	1MB/6.0.3	\$9/WORKSTATION	
FAXGATE (QUICKMAIL)	1.5	1MB/6.0.5	\$9/WORKSTATION	
FILEGUARD	2.7	1MB/4.2	\$1B	
FILEMAKER PRO	1.02	1MB/4.2	FREE	
FILEVISION V	1.1	1MB/6.0.2	*	
FILMMAKER	2.5	5MB/6.0.3	*	
FINALE	2.6	1MB/6.0.2	FREE	
FLEXICAD	2.20	5MB/6.0.4	*	
FONTMONGER	1.0.5	2MB/6.0.2	10/91	FREE
FONTOGRAPHER	3.3	1MB/4.0.3	*	
FONTSHARE	2.2	1MB/6.0	FREE	
FONTSTUDIO	2.0	1MB/6.0.5	*	
FORM Z	2.0	2MB/6.0	*	
FOXBASE+/MAC	2.01	1MB/6.0	FREE	

PRODUCT	V.	REQ.	*	S
FRAMEMAKER	3.0	1MB/6.0	3/92	*
FREEDOM OF PRESS LIGHT	3.0.1	2MB/6.0.3	FREE	
FREEDOM OF PRESS PROFESSIONAL	3.0.2A	4MB/6.0.3	\$250	
FULL IMPACT	2.0	1MB/6.0	\$50	
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2	*	
GENERIC CADD	1.1	1MB/6.0.5	*	
GEOQUERY	3.0	1MB/6.0	*	
GOFER	2.0	1MB/4.1	\$25	
GRACELAN	2.0	1MB/6.0.5	*	
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5	NA	
GRAMMATIK MAC	2.05	1MB/6.0	\$15	
GREAT GANTT	1.4	1MB/6.0	*	
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2	*	
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1	\$50	
HAND-OFF II	2.2.1	1MB/6.0	FREE	
HELP	1.0	1MB/6.0	2/92	NA
HYPERCARD	2.1	1MB/6.0.3	\$49	
HYPERDA	2.0	512K/3.2	*	
ICON-IT	2.1	1MB/6.0.2	*	
IF-X FORMS DESIGNER	1.1	1MB/6.0	FREE	
IGOR	1.2	2MB/4.1	\$35	
IMAGESTUDIO	1.7	1MB/6.0	\$99	
INFINI-D	1.1	4MB/6.0.4	9/91	FREE
INFOLOGIC ENVELOPE	1.1C	512KE/4.0	\$5	
INITPICKER	2.02	1MB/6.0	\$10	
INSIDE OUT	II	1MB/6.0.2	*	
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0	*	

PRODUCT	V.	REQ.	*	S
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2	*	
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2	\$99	
INSPIRATION	3.0	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0	FREE	
INTERFACE RAVE	2.0.5	2MB/6.0.4	FREE	
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
ITHINK	2.0	2MB/6.0.2	\$149	
KALEIDAGRAPH	2.1	2MB/6.0.5	9/91	\$20
KIWIENVELOPES	3.1	512KE/4.1	*	
LABVIEW	2.2	4MB/6.0.5	10/91	*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4	\$100	
LAPLINK MAC III	3.2	512K/2.0	FREE	
LAPLINK MAC PLUS III	3.0	512K/2.0	*	
LASERPAINT COLOR II	1.02	1MB/6.0.3	FREE	
LETRASTUDIO	2.0	2MB/6.0	*	
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5	*	
MACANALYST	3.1	2MB/6.0	*	
MACARCHITRION	5.5	2MB/6.0.3	*	
MACBRAIN	3.0	1MB/6.0.5	\$295	
MACDRAFT	2.1	1MB/6.0.2	*	
MACDRAW II	1.1	1MB/6.0	*	
MACDRAW PRO	1.0.1	1MB/6.0.5	11/91	\$99
MACENVELOPE	5.1	1MB/4.2	\$29.95	
MACENVELOPE PLUS	2.0	512KE/3.2	\$50	
MACFLOW	3.5.4	1MB/6.0	\$30	
MACFORTRAN II	3.1	4MB/6.0.3	\$99	
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3	\$19.95	

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PRODUCT	V.	REQ.	*	\$
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5		*
MACPHONEBOOK	3.0	1MB/6.0	9/91	*
MACPLOT PROFESSIONAL	3.7.4	1MB/6.0.5		*
MACPLOT STANDARD	3.7.4	1MB/6.0.5		*
MACPROJECT II	2.5	1MB/6.0		\$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1.1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.0	2MB/6.0.5		\$195
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS DELUXE	1.2	1MB/6.0		*
MACTOPS	3.1	1MB/6.0.5		*
MACWRITE II	1.1	1MB/6.0		FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPGRAFIX	2.1.1	4MB/6.0.3		*
MAPLE V		2MB/6.0.7		*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKET MASTER	3.0	1MB/6.0.3		\$95
MARKUP	1.03	1MB/6.0		FREE
MASTERFINDER	1.1	1MB/6.0.5	6/91	*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	4.52	1MB/6.0.2		*
MATHCAD	2.06	1MB/6.0.2		FREE

PRODUCT	V.	REQ.	*	\$
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5		\$20
METAPICT	2.0	512KE/4.5		\$69
META PRO	2.03	1MB/6.0		*
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	3.0	512K/4.2		*
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	3.0	1MB/6.0.2	9/91	*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.0	1MB/6.0.2	8/91	*
THE MICROSOFT OFFICE	1.5	1MB/6.0.2		\$129
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	1.1	1MB/6.0.4	11/91	NA
MICROSOFT WORD	5.0	1MB/6.0.2	4/92	\$129
MICROSOFT WORKS	2.0e	512K/6.0		*
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	3.1	1MB/6.0	7/91	*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1		*
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.0	2MB/6.0.3		*
MULTILEDGER	1.1	512K/3.2		\$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0	12/91	\$15
MYADVANCEDMAILLIST	3.0	512K/4.1		*
MYDISKLABELER III	3.0.4	1MB/6.0		*

PRODUCT	V.	REQ.	*	\$
M.Y.O.B.	2.0	1MB/6.0	10/91	*
MYTIMEMANAGER	4.0	1MB/6.0.3	11/91	*
NETMINDER ETHERNET	2.0	2MB/6.0		*
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2		*
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3		*
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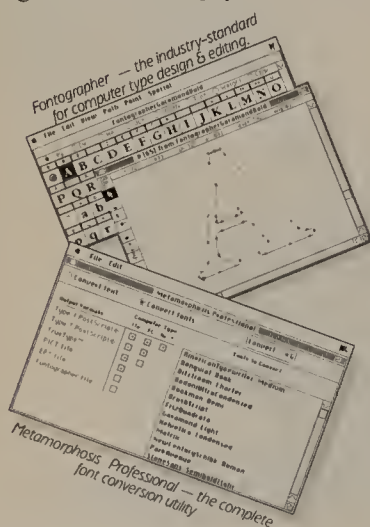
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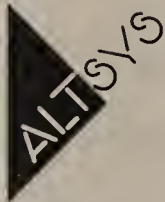
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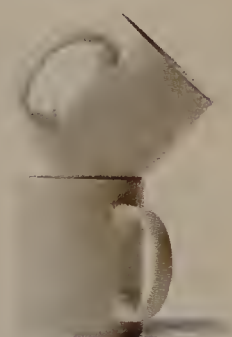
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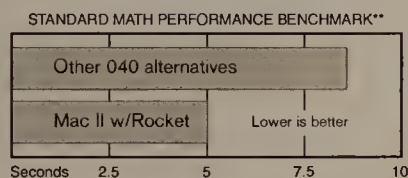
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Lab Notes

Calibration—Is It Worth the Effort?

BY DANNY LEE

WE HAD PUT 22 COLOR PRINTERS through a battery of speed and quality tests for our color printer roundup ("Color Printer Progress"). Now we wanted to calibrate one of the printers to see how closely the colors in its output would correspond to those of a match print. (A match print is a color proof that's produced from four sheets of film—one each for cyan, magenta, yellow, and black—which represents how the colors produced by an imagesetter should look.) For our calibration test, we chose the Tektronix Phaser III PXi.

Color values often differ dramatically from one device to another, but there can even be differences between two devices of the same type and model. This means that no printer can exactly duplicate all the colors as they appear on a monitor's screen, and no two color printers produce identical output.



HANK OSUNA

Characterization and Calibration

CALIBRATION IS CLOSELY RELATED to *characterization*—measuring the color characteristics, or values, of an input, display, or output device according to a standard *color space* (a range of possible color values). The most widely used standard is the one created in 1931 and adapted by CIE. (For a detailed explanation of the CIE color space, see "Color Printer Progress.") Calibration—making mathematical conversions and adjustments between devices—is not possible until those devices have been characterized.

Printer characterization is usually done by the vendor, who then uses those characteristics to create either a table containing all possible values of each color or a mathematical formula that defines all those possible values. This formula or

table can be saved either in the printer's ROM or the Mac's memory.

Choosing Calibration Software

FOR OUR CALIBRATION SOFTWARE, we chose Letraset's ColorStudio, which includes a calibration utility called Color-Calibrator. Calibrating with it is a one-pass process. That is, once you print a calibration sheet, obtain densitometer and spectrophotometer readings, and enter the values into a reference table, you're done. Equally important is ColorStudio's

accuracy: because it can measure 16 overlay colors, ColorStudio can print darker shades of color with more detail.

By letting you specify a minimum and maximum dot-gain percentage for each CMYK color (cyan, magenta, yellow, and black), ColorStudio provides precise control over dot gain—the increased density that occurs during halftone printing, which can produce

oversaturated colors in the final output.

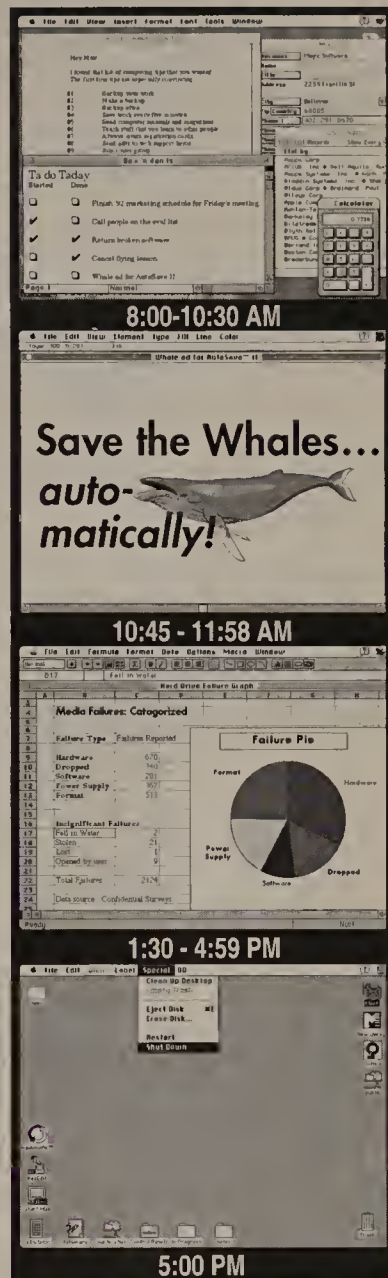
Calibration can also be done within Adobe Photoshop. But because Photoshop measures only 8 overlay colors compared with ColorStudio's 16, final output in Photoshop shows less detail. And Photoshop requires you to set one dot-gain percentage for all four CMYK colors. However, percentages can be varied by adjusting the Gray Balance option under Preferences/Printing Ink Setup.

Performing the Tests

WE BEGAN OUR TESTS BY PRINTING A calibration sheet on the Phaser III PXi. This sheet contains four columns, one for each process color: cyan, magenta, yellow, and black. Each column has 12 squares, or steps, each one representing a percent-

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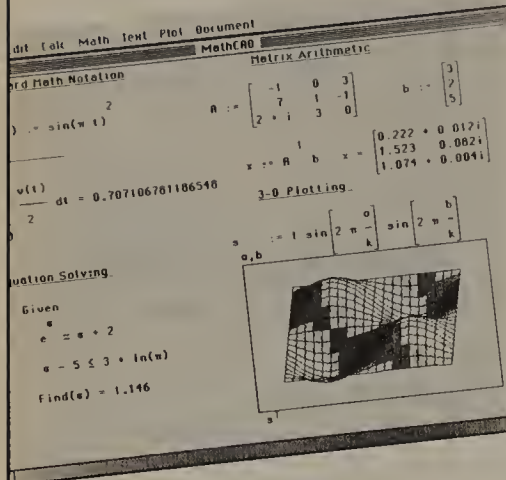
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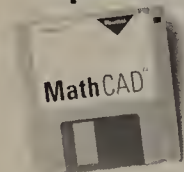
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age of that color. For example, the cyan column starts with a 5 percent cyan square, then a 10 percent one, continues on in 10 percent increments up to 90 percent, then 95 percent, and ends with a 100 percent cyan square. The same formula is used for all four colors. Below the columns are two rows—each containing 8 squares—of overlay colors that show the various combinations of cyan, magenta, yellow, and black.

Next, we needed to characterize the printer by measuring the density of each of the steps on the sheet as well as the saturation of the overlay colors. We used two measuring devices—a reflection densitometer and a spectrophotometer—to determine the inks' range of color values on white paper and save them (so applications would know what colors the printer is capable of printing). A reflection densitometer shines light on an image and measures the amount of light an image reflects back. For example, a 5 percent solid gray image will reflect 95 percent of the light that hits it. A spectrophotometer measures color in a CIE color space.

Using a Minolta CM-2002 spectrophotometer, we were able to measure each of the overlay colors here in the lab. For the density readings, we sent the calibration sheet to a local service bureau.

In ColorCalibrator, we first had to create a new *color matrix* (a table of color values) for the Tektronix printer. After selecting New Color Matrix from the Matrix menu, we chose CMYK for device type, and selected RGB Colorspace Clip and Align White to Screen.

We then chose New Printer Setting (Settings menu) to access the Printer Settings dialog box, where we checked Device Uses Halftones and deselected Separate Printing Step. We keyed in 300 for Device Resolution and checked Multi-color Density Tables. We chose Build Density Set (Build menu), created a new density table for our printer, and for each color we entered the density measurements taken by the service bureau. The density table replaced the color steps with densitometer values. We then chose Open Color Matrix from the Matrix menu and selected the color matrix we had just created. After selecting Build Process Color Match Set, we selected each CMYK color and entered the values we got from the spectrophotometer. Finally, we chose Rebuild All Matrices from the Matrix menu. We then saved all this information as a printer setting to be used in ColorStudio.

We launched ColorStudio and printed an image to the Tektronix using a default printer setting. Then, after selecting the new printer setting we'd just created, we opened and printed the image

again. What we got were two pieces of output with very subtle differences. When we placed the images next to each other and examined them carefully, we found the colors of the first image to be rather flat compared with the richer colors of the second image.

Next we sent the raw image file to a service bureau, where a match print was made. When we examined the match print and the two printouts from the color printer, we found that the output from the calibrated color printer was closer to the match print than was the original output. However, there were still differences, due to the accuracy of the densitometer (± 1 percent), the resolution of the color printer output versus the match print produced by the imagesetter, the differences in ink absorption of the various types of paper, and the characteristics of the inks used. Even with a properly calibrated system of monitors and printers, these inconsistencies can add up.

PostScript Level 2 Offers Hope

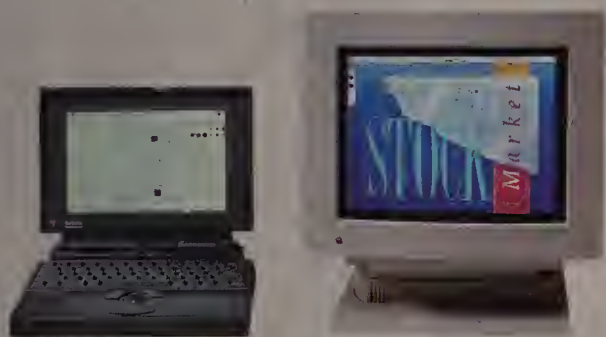
POSTSCRIPT LEVEL 1 (THE LANGUAGE used by most currently available PostScript printers) has some calibration capabilities. But because PostScript Level 1 printers don't contain color characteristic values—and Level 1 lacks the ability to read them anyway—output from different PostScript Level 1 color printers often varies drastically. Since PostScript Level 2 characterizes devices according to the CIE standard, color specifications are easily converted from one device to another to produce fairly consistent output on different PostScript Level 2 color printers regardless of variations in screen colors, inks, and printer technology (such as thermal, dye-sublimation, and ink-jet). Although several color printers already support PostScript Level 2 (including the Tektronix Phaser III PXi), until new drivers or applications are written for them, users won't be able to access many of the new features in Level 2. Similar to PostScript Level 2 are the Kodak Color Management System (KCMS) and the Kodak Precision software, currently licensed by Radius and RasterOps for characterizing and calibrating their color hardware.

Is calibrating with ColorStudio or Photoshop worth the time, resources, and expenses it requires? It depends on the type of output you need. For high-end users who spend hours or days creating and refining color images and who require precise color output, calibration is a must. For those who don't really need such precision, however, calibration may be hard to justify. For them, the characterization that PostScript Level 2 printers promise may turn out to be the best solution. **m**

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Thunderous Color!

REVIEWER'S NOTEBOOK: The advanced new line of NEC monitors is designed specifically for Macintosh users. They are magnificent, introducing flat-square screen, razor sharp resolution and rich color to the world. Faster, brighter screens are a must — without loss of focus. These features are available today from

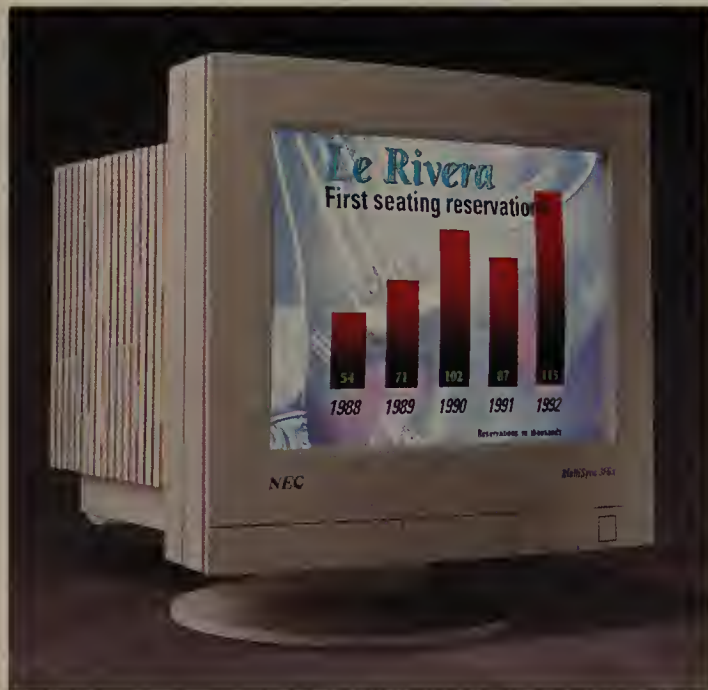
the NEC team of display researchers. The FG Series of monitors are packed with features, enclosed in a sleek cabinet that actually gives you more image area than conventional monitors. Each pixel is defined with unmatched clarity and saturated with color. No wash-out, no blur. The amazing new 4FG provides microprocessor-controlled, digital color. The on-board AccuColor system allows you to match PANTONE and Trumatch colors on screen! The Invar Shadow Mask allows a 20% brighter picture with no loss of clarity or contrast. And NEC's non-interlaced refresh technology allows flicker-free images.

An affordable technological leap? The NEC FG displays are actually less than any of the other pricey nameplates, and deliver more quality, advanced design and performance. How can you possibly beat that? Destined to become "Product of the Year"

The NEC MultiSync 3FGx. The designers and engineers went crazy on this one, packing unparalleled features and performance into this amazing new monitor. Like the new NEC FullScan capabilities and larger screen sizes, where you can see up to 36% more active screen display — without distortion. Its 15" screen is flat, and provides a high refresh rate. That means crisper images, brighter colors, richer tones and

more contrast. You'll notice the difference immediately when looking at your desktop! In fact, the 3FGx has been fine tuned for flicker-free images demanded by end users. The new flat-square screen design also enhances the display of single-pixel fonts on your Mac, so even your type will look better.

The NEC MultiSync 4FG. The 4FG revolutionizes monitors in one very important area: color accuracy. This new standard in video excellence is based on the concept of multiple-frequency engineering. And only NEC can do it. The award-winning 4FG is a 15" flat-square screen, digitally controlled monitor that features AccuColor. This revolution allows you to adjust colors to your preferences, or to match your printer's capabilities — even match Pantone and Trumatch colors! Like the 3FGx, the 4FG provides crisp images — 36% larger than conventional 14" monitors!



NEC MONITORS

CAE2708 NEC MultiSync 2A 13" w/Mac	
Connector Cable	\$395.00
CAE2709 NEC MultiSync 3FGx 15" w/Mac	
Connector Cable	\$660.00
CAE2710 NEC MultiSync 4FG 15" w/Mac	
Connector Cable	\$780.00
CAE8515A NEC MultiSync 5D 20"	\$1899.00
CAE8516 NEC MultiSync 5FG 17"	\$1489.00
CAE8517 NEC MultiSync 6FG 21"	\$3109.00

Sorry, no returns on these items. Shipping charges billed actual cost.

The NEC MacFG Display Interface Cards!

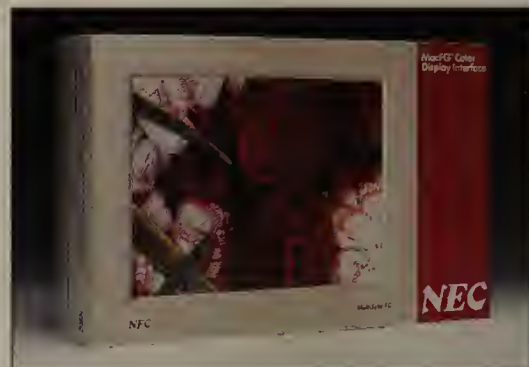
REVIEWER'S NOTEBOOK: Snap one of these color monsters into your Mac and get out of the way! You have never seen colors explode off the screen like they do with the MacFG line of high-color Display Interface cards. Including QuickDraw Accelerator, your MacFG cards can deliver incredibly fast graphics processing and greatly enhanced video performance for your MultiSync monitors. If you're going to invest in an NEC FG monitor (with the miraculous flat-square screen design and FullScan edge-to-edge display), take it all the way with one of these 8 or 24-bit cards.

Tiger tested these cards on a MultiSync 4FG and a Mac IIfx with impressive results: not only did we get the visual impact of richer, deeper downright bone-crushing color, but we saw improved resolution, sharper detail and outstanding contrast. Supports the NuBus Macintosh II family and the sensational new Quadra 700 and 900 computers. These advanced boards are the product of a joint venture, combining the talents of NEC and Radius, a leader in the Macintosh color display interface arena. Together, they've just made computing history.

It's an amazing sensation. Open up a file on your Mac and instantly feel the smooth color pour out of your NEC FG monitor. So crisp, so vibrant — it's almost real! The MacFG 8X Color Display Interface Card offers multiple display modes with real-time, switch-on-the-fly capability — just make your resolution selection from the Control Panel Device (CDEV) without restarting. This feature allows you to customize your resolution for each application you use. The 8X, 256-color card includes QuickDraw Acceleration for superfast processing and NuBus Block Transfer technology. The 8X is also upgradable to 16-bit, 65,536 colors or 24-bit, 16.7 million colors that really bring the house down. Includes RadiusWare software.

The Color Invader: MacFG 24X Color Display Interface Card. This superior card has all the built-in features of the MacFG 8X card with one very important addition: it fires out 16.7 million thunderous colors! It's as if the images were painted in vivid oils right on the surface of the monitor! Now your Mac screen can contain the same high-quality capabilities that professional color studios depend on.

Take a look at the competition and you'll quickly understand the enormous value of the MacFG Color



Display Interface Cards. Apple, CalComp, Ehman, E-Machines, Generation Systems, MacProducts USA, Mac Tel Technologies, Mega Graphics, Mirror Technologies, Nutmeg, Raster Ops, Sigma Designs, SuperMac Tech — we've seen them all and none holds a candle to the amazing realism of the NEC MacFG Series.

NEC COLOR INTERFACE CARDS

CAE2715 MacFG 8X Color Display	
Interface Card	\$799.00
CAE2716 MacFG 24X Color Display	
Interface Card	\$1599.00

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HOW TO PLACE AN ORDER

- **Ordering:** Just call 1-800-666-2562 Monday-Friday 8AM-10PM, Saturday 8:30AM-8PM and Sunday 11AM-5PM (eastern) and one of our representatives will be happy to take your order. Or, simply complete the order form and return it to us — your order will be promptly processed.
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- **How to Pay:** Pay for your purchases with VISA, MasterCard, American Express, Discover Card, by check (personal checks held 10 days) or money order. We DO NOT charge your account UNTIL WE SHIP THE SOFTWARE! We accept purchase



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- **Customer Service:** If you order your new software product by 3:00 p.m. e.s.t., then Federal Express picks it up the

same day for immediate shipment to you. If for any reason you are unhappy with your new software, simply call our Customer Service Department for a Return Authorization Number, and return it to us freight prepaid. We will gladly exchange it for any other product in our huge inventory.

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Hundreds of thousands of diskettes' worth of information, fun and productivity are packed onto just 7 speedy CD-ROMs! They include the amazing, full-length encyclopedia, complete with enhanced sound; a comprehensive world atlas, presented in full-color; the entertaining Cosmic Osmo; complete coverage of Operation Desert Storm with photos, sound and more; Ludwig Van Beethoven Symphony No. 9; the classic fairy tale, Cinderella in English and Spanish; and The Time Table of History. Without a doubt, it's the perfect introduction to CD-ROM, with everything included, nothing else to buy.

Desert Storm: The War in the Persian Gulf chronicles the war and the events that precipitated it, providing news reports, eyewitness accounts, photos, sound recordings, detailed maps and interviews.

The New Grolier Electronic Encyclopedia covers hundreds of topics in great detail. Many entries contain enhanced sound and vibrant color. It is the premier CD-ROM encyclopedia. 33,000 articles, 1,500

color graphics, numerous maps and stereo sound make learning exciting.

Switch to Ludwig Van Beethoven Symphony No. 9 and explore the entire work, as well as its historical setting... all while listening to the music itself.

Bring the classic fairy tale, Cinderella, to life on your Mac. This interactive program uses music and sound to enhance reading development and language skills.

Or, slip in the Time Table of History: Science and Innovations. More than 6,000 interrelated entries show the chronology of historical, scientific and technological events from the beginning of time to the present day.

From there, explore the earth's geography with The Toolworks World Atlas. This package contains the most extensive collection of full-color maps you'll find anywhere. There's also plenty of data about each country and region: population, industry and more.

For a little fun, try Cosmic Osmo — winner of the 1990 MacUser award for "Best Recreational Program." This fascinating adventure

parallel, serial and Appletalk — with on-board intelligent switching. There's 2Mb of memory, expandable to 5Mb, 35 built-in Adobe fonts and 14 bitmapped and 8 scalable HP fonts. The Silentwriter includes 2 HP-compatible font slots for additional cartridges.

The Silentwriter 95 is PostScript Level 2, with full HP III (PCL 5) emulation. Imagine, you can print PostScript and PCL — the Silentwriter 95 automatically switches emulations for you. One printer can handle your PCs and Macs. It's all here, built right in to the Silentwriter 95. We weren't able to find this combination of features anywhere else at any price. Full-featured PostScript laser technology at an affordable price! The print quality is absolutely perfect. Documents look typeset with the Silentwriter's Sharp Edge technology and Microfine toner. Now there's no reason to buy an off-brand printer. NEC is a name you know. The Silentwriter is a great-looking machine as well. Clean, striking design with solid performance.

At over \$500 less than the LaserJet III, \$700 less than the Apple LaserWriterNT and over \$1000 less than the QMS 410, the NEC Silentwriter 95 gives you advanced technology, quality materials and skilled workmanship at a lower cost! NEC means top value.



You Get All This: CDR-36 or 72, interface, 7 CDs and Stereo Speakers.

game follows Cosmic Osmo to the Worlds Beyond the Mackerel.

Amplified, Stereo Speakers! With the Koss SA/30 amplified stereo speakers, you'll actually hear the sounds of the world when you slip in a CD.

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CAE8336 CD Gallery w/CDR-36 . . . \$495.00

FREE Clip Art 3-D with CDR-36 or 72 Gallery Pack!

Mac Plus, SE, SE/30, Classic, LC or II Series; minimum 2 MB RAM; hard drive with at least 10 MB available space; System 6.05 or above; Hypercard 2.0 required for Time Table and Ludwig Van Beethoven's Symphony No. 9. \$25.00 shipping charge on this item. Call for more CD-ROM titles.

The Incredible NEC Silentwriter 95

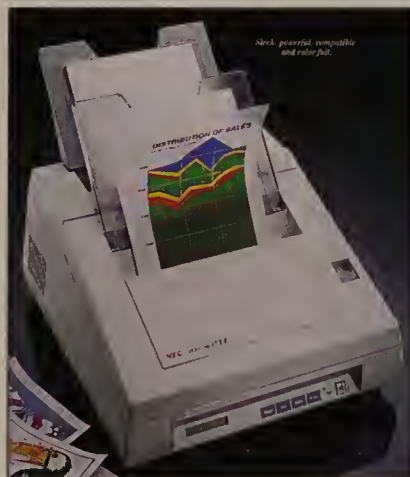
Microfine Toner Gives The Blackest Images!

The NEC Silentwriter 95

PostScript Power Made Perfect! The laser-printed page just got a new standard: The NEC Silentwriter Model 95. The new Silentwriter 95 features advanced Sharp Edge technology for exceptionally smooth type, without jagged edges. The secret is in the Microfine toner, that can be evenly spread across the entire image or text character. Microfine toner means consistent, pro-quality results for every page.



It's a speedster — the advanced controller benchmark tests at 68000 @ 16.7 Mhz — delivering 6 pages per minute with full support for PostScript Level 2 and Hewlett-Packard LaserJet III. Supports



Print Explosive Color Pages!

A Price Assault on the NEC Color PostScript Laser!

The NEC Colormate PS

It's color PostScript at its best. You will never be satisfied with anything less after you print your first full-color page. Your competitor's presentation will pale by comparison next to your color work. Fast, timely color sell sheets and promotional materials can be produced in just a few minutes with a Colormate PS. Rich, vibrant color, approved by Pantone. If you use a Pantone licensed product such as Corel DRAW! or Quark Xpress, you can produce the highest quality simulations for color matching applications. It's a snap to install, simple and reliable to use — even replacing the four-color ribbons takes just a few seconds. Just pop-in a disposable cartridge. A built-in library of 17 Adobe fonts provides plenty of on-line type variety.

NEC PRINTERS

CAE8522 NEC Silentwriter Model 95 . . . \$1545.00
CAE8525A NEC Colormate PS Model 40 . . . \$4295.00

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The Best Way to Improve Your Writing.

REVIEWER'S NOTEBOOK: *One of the more popular categories in software is the grammar checker, arguably the most important word processing add-in. With today's business climate, poorly written correspondence is separating success and failure. RightWriter's depth and attention to the details of written communication makes it the premier grammar checker for the Mac. Conclusive testing has established RightWriter as the most accurate, most flexible and easiest to use over any of its competitors.*

Improve Your Writing by Checking Grammar, Style, Punctuation, and More. In business, you're judged by what you say — and by how you write. Nothing can kill the confidence of a prospective customer or client faster than a proposal littered with grammatical, usage and punctuation errors.

The fact is, there's no excuse for sloppy, error-filled written communication. Each letter, report, proposal, press release or other business document you prepare should represent you as a professional.

RightWriter 3.1 is designed to flag errors in your writing from a rule base of over 4,500 — including rules of grammar, style, usage, punctuation, sentence structure, subject-verb agreement and more. RightWriter produces a copy of the document and performs its analysis. Then displays (or prints) your document with flagged errors and explanations. These explanations are your guide to better writing.

Good Writing is Good Business. Good writing can mean profit for your organization, satisfaction for your customers, and advancement for your career.

A well-written sales letter or proposal can make the difference between a successful sale and a lost opportunity. Nothing can kill the confidence of a prospective client faster than a proposal littered with errors in grammar, word usage and punctuation.

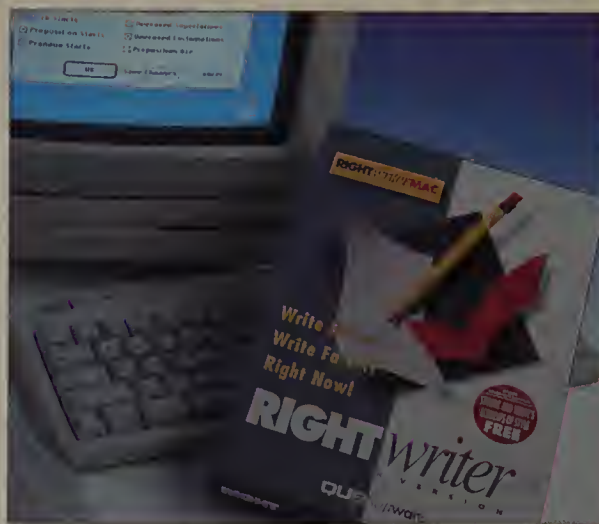
Clear, easy to read manuals result in customer satisfaction and lower support costs. Good writing helps you get your best ideas across.

RightWriter works with your word processor to help you make your business writing strong, clear and to the point. Not a spelling checker — RightWriter is a sophisticated expert system that applies the rules of good writing directly to your documents.

To use RightWriter, create a document with your word processor. Then run RightWriter on the document using a few simple mouse selections.

RightWriter inserts comments into your document pointing out problems in style, word usage, grammar, and punctuation. Use your word processor to make the changes you consider appropriate. Then tell RightWriter to remove its comments. The result — strong, clear business writing.

RightWriter also rates your documents for readability and strength. These summary indexes help you target your writing to specific audiences. The result is powerful, effective writing.

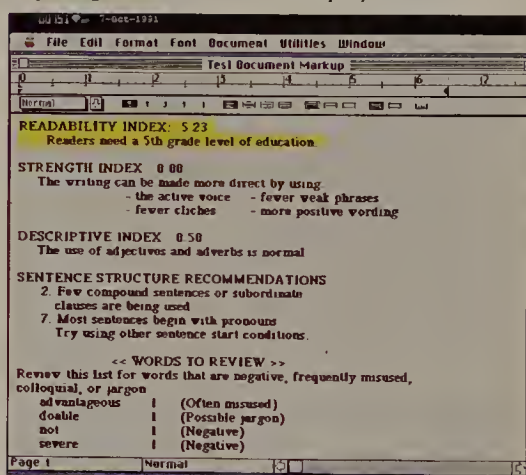


ability and strength. These summary indexes help you target your writing to specific audiences. The result is powerful, effective writing.

Change Writing Styles. RightWriter is primarily an aid for **Business and Technical Writing.** The RightWriter rules are based on the mistakes commonly made by business professionals when writing letters, memos and reports. Since many of these rules are common to all types of writing, RightWriter is also useful for other applications.

Additionally, RightWriter allows you to select the **type of writing** before analyzing a document. By making this selection, you actually change the rules RightWriter uses for the analysis.

The standards for business writing differ in several important ways from those for fiction. Where business writing should be concise, fiction must often set the scene. Also, good fiction writers create their own style and use literary license. With **fiction** selected as the type of writing, RightWriter can find many common problems in fiction writing, without imposing the stricter rules employed for business



A Detailed Summary. Along with specific recommendations about your writing, RightWriter provides information about the document's overall strength and clarity. These comments are your guide to better writing.

writing. The types of writing you can select include: **general business, technical reports and articles, proposals, manuals and fiction.**

RightWriter also provides an option to change the word dictionary. This is especially useful for technical, legal, medical and other types of writing with specialized vocabularies. For advanced users, there are even options to turn specific rules on or off.

How RightWriter Knows When Your Writing is Wrong. RightWriter proofreads your documents using two artificial intelligence (AI) technologies called parsing and expert systems. Each technology has a separate, unique function, but together they rely on one another to identify parts of sentences and to locate errors.

Parsing performs the critical function of sentence dissection. It first identifies sentences' individual parts, breaking each sentence into major phrases and looking for both dependent and independent clauses. Parsing goes further by identifying the subject and predicate of each clause and noting the word's part of speech. This technology, for example, can tell the difference between "can" used as a noun and as a verb.

The expert system relies on the parser to break down sentences so it can determine their accuracy. RightWriter's expert system examines your writing, judges the accuracy, and suggests improvement without your making any specific query.

The Compatible Grammar Checker. RightWriter for the Mac is fully compatible with any document from: MacWrite® version 2.2 through 5.0; MacWrite II version 1.0 and 1.1; Microsoft® Word version 3.0 and 4.0; WordPerfect version 1.0 through 1.0.4; WriteNow™ version 1.0, 2.0 and 2.2; or any other standard ASCII editor.

Simply analyze your document and RightWriter automatically creates a marked-up copy of the document — complete with inserted corrections and comments.

From your own familiar word processor, open the marked-up copy and review the suggestions. Make the changes you want, then let RightWriter remove all the extra corrections and comments.

What's left is a clean copy of grammatically correct, effective communication.

Over 4,500 Rules, Including:

Grammar Rules

- Noun-Verb Mismatch
- Sentence Fragment
- Run-On Sentence
- Misused Verb
- Misused Pronoun
- Misused Article
- Wrong Verb Form
- Misused Word
- Possessive Use
- Is This Correct?
- Repeated Word
- Capitalization

- Overused Phrases
- Single Word Quote
- Contraction

Usage Rules

- Colloquial & Slang
- Archaic
- Sexist
- Legalese
- Computer Terms
- Vague
- Wordy
- Redundant
- Questionable Word
- Not A Word
- Offensive
- Rephrase
- Modified Absolute
- Misleading Euphemism
- Negative
- User Flag

Punctuation Rules

- Missing Question Mark
- Unnecessary Comma
- Missing Comma
- Misused Semicolon
- Misused Quotes
- Reversed Punctuation
- Unbalanced Quote
- Unbalanced Bracket
- Unbalanced Parenthesis

Style Rules

- Passive Voice
- Split Infinitive
- Long Sentence
- Sentence Length
- Difficult Sentence
- Use Verb Form
- Long Paragraph
- Start With But
- Conjunction Start
- Weak Sentence Start
- End With Preposition
- Negative Sentence
- Use Simpler Terms
- Use Simpler Word
- Consider Omitting
- Ambiguous Wording
- Cliche

BONUS!

Strunk & White's The Elements of Style Electronic Edition

INCLUDED FREE WHEN YOU BUY RIGHTWRITER FOR THE MAC!

Reviewers have called it "...the best book of its kind" and raved, "The work remains unparalleled, direct, correct and delightful." Now *The Elements of Style* is available on diskette for your Mac.

Get RightWriter & Elements of Style **\$99.95 value**
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Both Just \$29.95!

RIGHTWRITER MAC 3.1

CAE3366 RightWriter Mac **\$29.95**
Requires 512K and any Macintosh computer, 800K 3 1/4" diskette drive, System 3.2 and Finder 5.3 or later.

Grammar Rules	
<input checked="" type="checkbox"/> Noun Verb Mismatch	<input checked="" type="checkbox"/> Wrong Verb Form
<input checked="" type="checkbox"/> Sentence Fragment	<input checked="" type="checkbox"/> Misused Word
<input checked="" type="checkbox"/> Run-On Sentence	<input checked="" type="checkbox"/> Possessive Use
<input checked="" type="checkbox"/> Misused Verb	<input checked="" type="checkbox"/> Is This Correct?
<input checked="" type="checkbox"/> Misused Pronoun	<input checked="" type="checkbox"/> Repeated Word
<input checked="" type="checkbox"/> Misused Article	<input checked="" type="checkbox"/> Capitalization

OK Save Changes Cancel

Turn on/off specific rules to suit your particular style.

Create Full 3-D, Photorealistic Images!

REVIEWER'S NOTEBOOK: *MacRenderMan* and *Showplace* (bundled together in this offer) represent the finest software available for 3-D image creation, viewing and manipulation. *MacRenderMan* allows you to create incredibly realistic images, while *Showplace* allows you to import those images and create scenes, with complete control of lighting, texture, backgrounds, vantage points and dozens of other effects. Altogether amazing, surprisingly easy and fast. In fact, *RenderMan* was used in creating the academy award winning film, *Tin Toy*. Impressive results can be achieved in a short time, but if you get the urge, you can get crazy with these products and never be seen or heard from again...

MacRenderMan. Fascinating photorealistic design made easy (and fun). Three distinct dimensions in full color, with a variety of surface textures and designs. In our first session, we created several billiard balls with a variety of whacked-out designs and colors in under an hour. That hour passed quickly; most of the real work was handled by *MacRenderMan* transparently.

We began the modeling process by describing the objects (geometry and appearance), the characteristics of the lighting (the light sources) and the view we wanted of the object (the camera, if you will). We then had a scene! We could change the texture of the surface (and how the light reflects off of it) and easily control the various shading techniques. The more you work on your images, exploring the powerful capabilities of *MacRenderMan*, the more detailed your images become. This is a great tool for CAD projects, product design, animation, merchandising, architecture and presentation graphics. Nothing else can compare to the images you'll create with *MacRenderMan*, the most visually accurate picture making product available for the Mac today.

MacRenderMan is used with 3-D design applications that produce *RenderMan* Interface ByteStream (RIB™) files. Use your favorite 3-D design system to shape objects. The design software will record these geometric descriptions into a RIB file and spool the file. *MacRenderMan* reads the spooled RIB file and produces a color rendition, computing it in the background under *MultiFinder*.

The MacRenderMan Software Package. *MacRenderMan* is a package of applications designed to bridge the gap between modelers and renderers on the Macintosh. *MacRenderMan* includes:

- **RenderMonitor.** Similar to the PrintMonitor desktop application available under *MultiFinder*, *RenderMonitor* allows you to render images in the background, so you can continue with other functions while it works.
- **Chooser.** The standard Macintosh Chooser desk accessory allows you to select a renderer from among those that are available, and to set up renderer options for each one.
- **PhotoRealistic RenderMan**

RenderMan. The *MacRenderMan* package includes Pixar's high-quality renderer, known as *Photo-Realistic RenderMan* (or *PhotoRMan*), as the renderer of choice for most applications. This is the default renderer selected by the Chooser.

- **Vector RenderMan Renderer.** A second renderer, known as the *Vector RenderMan* (or *VectRMan*), is also included with the *MacRenderMan* package to generate wireframe images as quick approximations for more detailed renderings.
- **Example libraries and demos.** Example libraries of RIB files, shaders, and texture maps are provided. A sample modeling application called the "Pencil Demo" is also included to illustrate the use of shaders on different parts of a simple model.



Give images 3-D beauty and realism.

Showplace. *Showplace* is the forum for your objects created with *MacRenderMan* technology. Build a dazzling 3-D scene by quickly importing and arranging *MacRenderMan* images, or choose from the library of Pixar ClipObjects, including furniture, lamps, a sleek racing bicycle, billboard, shopping bag, a theater spotlight and more. Then turn your camera loose and move around your scene to create spectacular effects and perceive a multiplicity of angles.

Change the "look" of an object by changing its surface: you could have an oak grain table and a stucco-painted wall, or a stucco-painted table and an oak grain wall, or an oak grain shopping bag and brushed chrome walls! With *Showplace*, you can decide the appearance of an object independently of its shape. *Showplace's* ability to combine any object with any appearance (including those you create) is one of its most powerful features.

These "Looks" include: bricks, brushed chrome, gold and copper, concrete, gray and rose granite, veined marble, natural oak, plastic and sky patterns, among others. Manipulate characteristics such as shininess, size, roughness and reflectivity. It's your own world of synthetic reality! Then take a TIFF or PICT image and wrap it around any 3-D object in your scene to create dramatic effects, impossible in 2-D graphics programs.

Using *Showplace*, you could create a slide presentation that features *MacRenderMan* images in a variety of shocking, interesting, unusual and impossible ways. Like messages on balloons and billboards, in the pages of books and emblazoned on the surface of a table. You can add fog, smoke and atmospheric conditions to your scenes, adjust the lighting and create masterful shadow detail.

The Four Showplace Elements.

There are four elements, or "things you can manipulate" in the *Showplace* world. Each element has its own toolbox and a corresponding menu.

- **Objects.** An object is a collection of one or more surfaces. They are the main elements of the scene. An object might be created in some modeling application, or installed as part of a ClipObject library. In either case, the



Magnificent pictures, life-like shadows...

object can be imported into a *Showplace* scene and resized, rotated, or moved.

- **Surfaces.** A surface is part of an object that can take on a single appearance. A *Look* can be attached to a surface to give it a certain appearance in the final image. For example, it could be transparent glass, wood grain or metal.
- **Light Sources.** The definition and placement of light sources in a scene is essential to its look in the final image. Shadows, the appearance of spectacular highlights on surfaces, and the illumination of different areas of the scene are all determined by lights.
- **Cameras.** Everything you see in the *Showplace* world, and thus everything that will appear in your final image, is seen through the lens of a camera. You can set up several cameras at various locations to give you different vantage points from which to view the scene. You can move these cameras, save their locations, and choose which to use at will.

Showplace comes complete with a videotape that walks you through the production of a scene in detail. We found that the videotape alone was enough to get us going with *Showplace*, all the functionality is explained in a simple, straight forward manner. Although *Showplace* is a lot of fun just to play with, you'll soon discover how you can work the intriguing scenes into your presentations and on-screen demos.

These fine products transcend any paint or draw programs you've ever used, employing technology seen only in high-end design and animation studios. The images will certainly stop an audience! If you need a presentation that's a cut above, nothing will deliver the impact like *Showplace*.

ALSO AVAILABLE IN CD-ROM VERSION

MacRenderMan and *Showplace* applications, complete online documentation for both products, a gallery of images created with Pixar products and a sample of Pixar animation all on one CD-ROM!



MACRENDERMAN & SHOWPLACE

CAE2410 *Showplace* & *MacRenderMan*
Bundle \$595.00

CAE2411 *Showplace* & *MacRenderMan* CD .. \$425.95

Showplace: runs on any Macintosh II family computer with a floating point coprocessor, 32-bit QuickDraw, *MultiFinder* and at least 5 megabytes of internal RAM (8 is recommended); color display system (for full-color viewing, 24-bit is recommended). *MacRenderMan*: Macintosh II, IIx, IIcx or IIfx running Systems tools 6.0.3 or higher; *MultiFinder* and 32-bit QuickDraw installed; 5 MB of disk storage; 8 or 24 bit color display system; 5 MB of memory (8 MB recommended); *RenderMan* compatible design package.

The Art Of The SCAN



REVIEWER'S NOTEBOOK: *The Logitech series of advanced mice and scanners has won acclaim from the press — and thousands of loyal users. No other manufacturer engineers so much precision and innovation into their products. From an incredibly sharp hand scanner, to the all new breed of "programmable" mice, they're a pleasure to work with. We put the ScanMan 32 hand scanner through its paces, performing over 50 scans of various black and white images — photos, line art, logos, type, illustrations — even poor-quality photos. The ScanMan 32 features 32 gray scale performance, with adjustable scanning resolutions from 100 dpi for quick scans; up to 400 dpi for magnificent finished images. Use scanned images in word processors, multi-media, desktop publishing, HyperCard, OCR and more. Hold a Logitech device in your hand and you'll notice the superior craftsmanship, the precise movement of the rollers and the extra large scanning window so you can see as you scan. Scan instead of re-keying data: capture text (with OCR software) with crisp, clean results.*

The Science of Scanning. Logitech technology destroys the old barriers of scanning, increasing the speed and accuracy of anything you scan. Superior image quality, with the ability to produce halftones for reproduction. The set of output controls provide the best possible results on any printer or monitor screen. Its 4" wide scanning area allows full-page scans with just two quick passes.

And Logitech's rugged construction and precision roller system allows straight, unwavering scans. No curving, no skipping. The scanning speed indicator controls the movement for perfect scans every time. There are three settings for scanning photos and another for scanning line art. Its shape is perfect, its weight and components distributed equally for balance. All of which makes getting an image from paper—into your Mac, simple and easy.

The ScanMan 32 gives you a free set of software editing tools, including a 32 gray scale palette for detailed retouching. There's also a handy dimension box and tear off tool palette; use them alone or incorporate them as a desk accessory. Pop up real-time brightness and contrast controls, refine images with amazing flexibility, rotate, flop and invert images. Save your scans in a variety of formats, including MacPaint, TIFF and PICT).

Here's What You Get: The ScanMan 32 contains everything you need. The Model 32 Gray Scale scanner, SCSI interface box and cable, power supply adaptor, ScanMan software, version 2.0, CatchWord Pro OCR software and complete user guide. Fast, easy, compatible — and powerful — the ScanMan 32 is a superior hand scanner.

FREE with the ScanMan 32 — CATCHWORD PRO: Powerful Optical Character Recognition (OCR) software that allows you to capture printed, hard-copy data by scanning it, rather than typing it. But, without quality software and a high quality scanner (like the ScanMan 32), scanning text won't work properly.

"Dirty" scans produce unwanted characters and commands, requiring enormous cleanup — creating more work than rekeying.

CatchWord Pro delivers an amazing 99% accuracy in OCR testing, used in tandem with the ScanMan 32. CatchWord Pro is compatible with popular word processors, spreadsheets, databases and desktop publishers — so you can scan information directly into your application and use it immediately! Different types and sizes are no problem, any printed characters, in any size of typestyle are instantly recognized. It will even automatically convert two scans into one, full-page image.

What about larger, memory-intensive photos and pages packed with small type, don't they slow my system to a crawl? The answer is "no" and only Logitech can say that. While other scanners are notorious for system slowdown, all of your ScanMan 32 scans zip along with Logitech's ingenious memory management features that automatically swap image data between your system's RAM and hard disk.

The instrument itself is a masterpiece. From the genius of the respected industrial design firm, Frogdesign — also responsible for the new line of NEC monitors and other distinctive hardware products, the ScanMan 32 is different from the ground up. First, you'll notice that it's heavier, with precision rollers that provide more "grip" along with a superior guidance system for light-touch control. All of which means you can scan quickly and accurately — once — and capture the image perfectly. While many other hand scanners rely on you to move in a straight line as you scan, the ScanMan 32 provides fully balanced, direct movement.

Using the ScanMan 32, you can create instant layouts, experiment with backgrounds and special effects. Add text and explore sizing and cropping options within seconds. That's why the hand scanner has caught fire in the design world: its ability to let you see many different visual combinations.

Businesses use scanners to capture text as described above and for keeping archival records of paper documents with instantaneous access. Logitech's advanced technology gives you more flexibility, more creative tools and more value than any other scanner.

Although there are two basic scanning modes in ScanMan, there are in fact three ways of scanning an image: Line art mode, Gray mode, or Mixed mode.

Line Art Mode. Line Art mode is useful for scanning black and white line drawings, diagrams, and text. This mode produces high-contrast images in black and white (no grays).

Gray Mode. Gray mode is useful for scanning photographs, color images, and drawings where the high-contrast black or white character of Line Art mode detracts from the quality of the image.

Desktop publishing programs enable you to combine your ScanMan images with text. Most of these programs accept either PICT or TIFF format files. PICT format enables you to work with compact files, although you won't be able to change the display format of the document or the grays. In TIFF format, you can alter the screen angle, dithering options and proportions of the document.

Mixed Mode. The third, and less common method of scanning is Mixed mode. Mixed mode is useful for certain specialized applications, and for experimenting with ScanMan to produce different effects.



Actual unretouched scan.



MORE THAN JUST ONE BUTTON. Logitech is committed to providing extra ease for Mac users. The Macintosh graphic environment takes maximum advantage of the special features offered by Logitech's desktop tools. Although the single-button Macintosh mouse meets many peoples' needs, three mouse buttons offer the extra functionality that make Macintosh, A/UX and X-Windows systems more convenient to use.

Now, Macintosh users can save desk space without relying on a large, clumsy ball to do it. Logitech's award-winning TrackMan® Stationary Mouse combines the advantages of both mice and trackballs in one unique device.

TRACKMAN® — High Resolution Stationary Mouse. TrackMan puts an input revolution on the Macintosh desktop. This award-winning design takes a trackball from a large center position and makes it smaller and more manageable by putting it under your thumb. It's easier to move around the screen, freeing your fingers to work the three large tactile buttons. Shaped so your hand rests on it easily, Trackman is more comfortable than any other trackball or stationary mouse.

• **Stationary and easy to install:** perfect for anyone with limited desk space as it requires no additional room to move on the desktop. Just plug it into your Macintosh ADB port and you're ready to go.

• **3 buttons:** the functionality that makes Macintosh, A/UX and X-Windows systems more convenient to use.

• **Easy programmability:** MouseKey™ Control Panel software lets you easily program the mouse buttons for your most used keystrokes or menu shortcuts in each application. You'll save time and get everything done more easily. Once you've pro-

grammed for an application, MouseKey remembers the settings.

• **Perfect precision:** thumb-operated ball provides greatest ease, precision and comfort.

• **High resolution:** adjust the resolution from 150 to 300 dpi to get just the precision you need for every application.



MOUSEMAN™ — High Resolution Ergonomic Mouse. MouseMan is more mouse than you've ever seen before for your Macintosh. Three programmable buttons offer you ultimate flexibility — program them for the tasks you perform most

and watch your productivity rise! MouseMan offers the same high quality and excellent tracking on any surface that have built the reputation of all Logitech mice — constructed with the finest materials.

• **Evolutionary ergonomics:** the next great advance in mouse ergonomics, MouseMan features left- or right-handed versions with angled curves that fit your hand perfectly.

• **Easy programmability:** MouseKey™ Control Panel software lets you easily program the mouse buttons for your most used keystrokes or menu shortcuts in each application. You'll save time and get everything done more easily. Once you've programmed for an application, MouseKey remembers the settings. You can assign a variety of tasks: click functions, view, modify or delete — even program it to draw circles automatically.

• **3 buttons:** make Macintosh, A/UX and X-Windows systems more convenient to use.

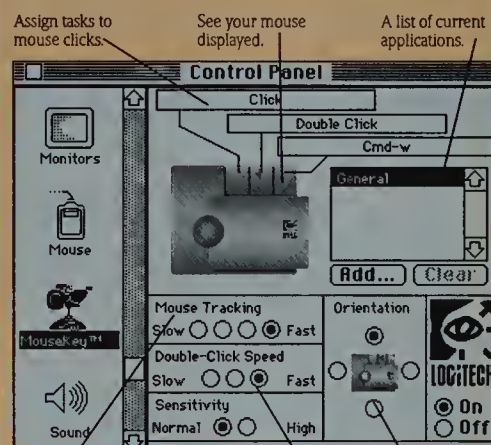
• **High resolution:** adjust the resolution from 200 to 400 dpi to get perfect precision for every application.

• **Exceptional quality:** Logitech mice meet the stringent quality requirements of both the largest systems manufacturers and our desktop customers: tested to 300 miles of life and more than three million button operations.

• **Easy to install:** just plug it into the ADB port on your Macintosh.

Programming Your Logitech Mouse.

The MouseMan Control Panel sets up your mouse buttons to do anything you want them to ... change speed, response time, sensitivity, and more.



Mouse Tracking. Set how fast the pointer moves in response to the speed of your mouse.

Sensitivity. Set the precision and distance with which the pointer travels when you move your mouse.

Orientation. Set pointer moves to match the direction in which you move the mouse.



LOGITECH

CAE2509 ScanMan 32 w/ CatchWord Pro \$299.00
CAE2510 TrackMan MAC Upgrade \$69.00
CAE2511 MouseMan MAC Upgrade \$59.00
ScanMan 32: Macintosh Plus or better running System 6.0 or later. Hard disk recommended. TrackMan/MouseMan: Any ADB Macintosh running Macintosh, A/UX or X-Windows Operating Systems.

TIGERSOFTWARE

Information & Orders: 1-800-666-2562 Int'l Orders: 305-443-8212 Fax: 305-444-5010



SAME PRICE AS GROUND

A World of Information on Your Desktop!

REVIEWER'S NOTEBOOK: *The INFODESK series is an important milestone in reference software. Three classic works are now available for the Macintosh. Each contains a wealth of current information, arranged for easy location and accessed through the powerful INFODESK engine. You'll use these titles often. They're fun to just browse through!*

Random House Encyclopedia. The best-selling encyclopedia that puts a full-blown reference center right on your Mac! Simple and fun to use — without

a CD-ROM player. Ideal for students, professionals, researchers, writers and makes a wonderful gift for anyone. Just click to explore History, Geography, Philosophy/Religion/Mythology, Social Sciences, the Arts, Science, Sports and Leisure, Law, Government and more.

Using the powerful, built-in search and retrieval tools, you can see a quick overview of Chinese history, the advent of computers, facts about Romanian agriculture or learn how a nuclear power plant works. Click on Sports and learn about Ty Cobb, Hank Aaron and the immortal Babe Ruth. Click on Science and travel back to July 20, 1969 and Neil Armstrong's historic moon walk. Click on Arts and Music and Instruments to travel through the careers of Elvis, the Beatles and others. Click on Government and explore the lives of George Washington, Thomas Jefferson, JFK and others. It's fast, easy and fun — ready to go right out of the box.

Arts & Entertainment, Language, and The Human Condition. These Classes contain 20 Subclasses, 125 Categories, and 700 Subcategories.

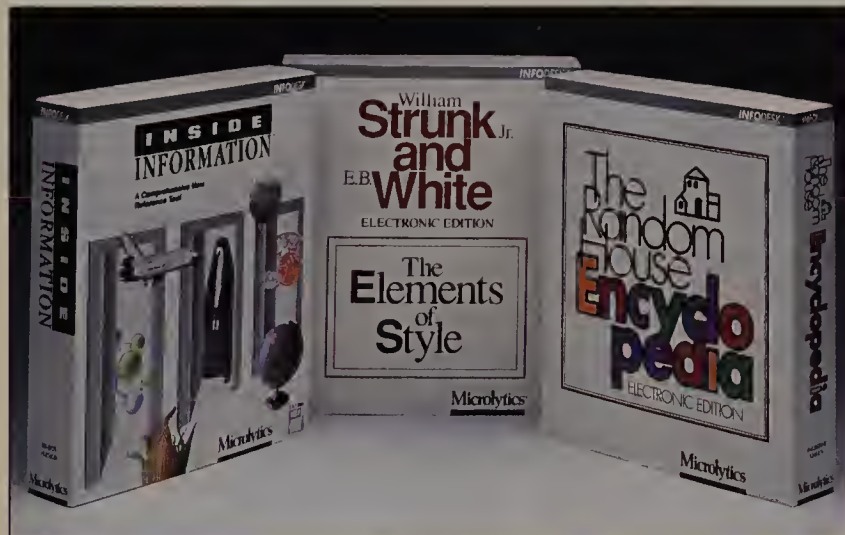
Categories are defined by subject matter, such as Chemistry, Law or Music — or by a common property, such as Colors, Tools, Verbs of Motion — or even a specific usage, like Insults, Slurs & Epithets.

Dig deeper into each Class in three different ways: outline view, graphic view or tree view. The reverse dictionary lets you type a few descriptive words, then see a listing of appropriate terms and definitions. Inside information is a great all-around tool — and an ideal argument-ender!

Strunk & White's Elements of Style. Reviewers have called it "...the best of its kind" and raved, "The work remains unparalleled, direct, correct and delightful." Now **The Elements of Style** is available for your Apple Macintosh or IBM PC compatible computer.

Based on an original work by William Strunk, Jr., a Professor of English at Cornell University, this updated third edition, prepared by noted writer and grammarian E.B. White, has become a classic of conciseness. It's the ideal tool to make your writing crisp, succinct and powerfully effective.

Anyone who needs to communicate effectively in writing will find *The Elements of Style* packed with specific, pertinent examples to improve writing style and structure. It's an easy-to-access educational reference work for the rules and principles of correct English usage. Includes seven rules of usage, eleven principles of composition, several matters of form, a list of often misused words and a style guide.



Inside Information. This new Desk Accessory is a comprehensive reference tool which organizes the English language into logical Categories of defined words. Far more than a dictionary or thesaurus, INSIDE INFORMATION lets you quickly and easily explore any of seven general Classes: Nature, Science & Technology, Domestic Life, Institutions,

RANDOM HOUSE

CAE2350 Random House Encyclopedia Mac	\$65.00
CAE2000 Inside Information Mac	\$65.00
CAE2600 Elements of Style Mac	\$35.00

Advanced Grayscale Image Enhancement And Manipulation.

REVIEWER'S NOTEBOOK: *If you've got a scanner, this product is for you. A professional-quality image manipulation product with scores of tools, filters, masks, retouching features and more. Supports TIFF, PICT and EPS. Features a customizable tool palette, advanced magnification features and input/output device calibration for best-possible reproduction. It is a true second-generation grayscale image enhancer, so you have complete control of your scanned images, not just two or three options. Create images that you simply couldn't before—clean, crisp halftones from imperfect originals. Grab just parts of a photograph, create a montage, filter images for reproduction with higher quality than you've ever seen before. In use today by graphic designers, scientists, publishers and professional retouchers. Magnificent anti-aliasing tools to eliminate jagged edges and uneven tones.*



masking and more. You can work with any portion of a photo, retouching just the foreground subject or just the background. Eliminate objects, deepen contrast, posterize just a portion of the photo and eliminate unwanted shadows — even lighten shadows.

Create dithered images or convert scanned dithered images to gray scale or vice versa. Create surrealist effects by combining blurred or smudged backgrounds with razor-sharp foreground images. The toolbox functions are familiar to those in your paint program, but include far-reaching capabilities that provide unlimited effects. The feathering feature allows you to create soft-edged images and the Fringe option allows you to create spectacular borders.

Images can be scaled, rotated, resampled, aligned, cropped, cloned, flipped, stretched, slanted, distorted and displayed in a variety of perspectives. A few moments of experimentation with the Enhance filter set will be an engaging experience. Create line images from photos, clean up blurry originals, posterize and emboss images, equalize images for perfectly even grayscales. There are simply endless numbers of combined effects.

The manual is excellent, providing a quick education on the construction of photographic images, how to scan them for top-notch results and how to quickly calibrate your scanner and output device to make the most of their abilities. You'll learn about the nature of grayscale, how it can be manipulated and improved. The difference between halftoning and dithering, and when to use each in your work. Using Enhance, you can create your own images, or manipulate any existing image created on a scanner, video digitizer, or virtually any other source.

When you get serious about your newsletters, advertisements and other desktop publications, Enhance is the only tool for the job of manipulating second generation images. Nothing else we've ever seen at any price delivers more professional tools (with the ease of use and speed required to make them truly useful) for putting photos on paper. Enhance's toolbox is fully customizable. And, although Enhance was designed to provide the ultimate in black and white image enhancement. No other grayscale image system even comes close.

Using these tools, there are an infinite number of modifications available for any given photo. Blur, sharpen, brush, dropper, edge detection, smudge,



ENHANCE

CAE2447 ENHANCE	\$230.00
Macintosh SE30, LC or Macintosh II family of computers with 2 MB RAM; 8 bit color video card with gray scale or color monitor recommended.	

Pay The Absolute MINIMUM Postage Possible!

The Only Fully Integrated Postage-Reduction Software Certified By The U.S. Post Office.

REVIEWER'S NOTEBOOK: *Nothing else in its class... SuperBulkMailer+ is the only fully integrated bulk mailing system for the Mac. Dramatically increase your response with cleaner, accurate and more efficient mailings!*

SuperBulkMailer+ contains unbelievable power, and is remarkably simple to use to its full potential. It is CASS (Coding Accuracy Support System) certified by the United States Post Office. Achieve the lowest possible rate for your bulk mailings — up to 50%. Quick, easy importing of any mail list in any program or platform, with any delimited or non-delimited fields in ASCII format. SuperBulkMailer+ automatically corrects, parses, standardizes, adds Carrier Route, ZIP+4 and bar codes to your list. The most complete set of features we've ever seen for economical 1st, 2nd and 3rd Class sorting. Save thousands of dollars on your mailings right off the top, then fine tune for lowest rate. Eliminates undeliverable and duplicate records by exact name, phonetic name or phonetic coding. Allows you to instantly build your own searches, create custom reports, mail-merge letters with ease and choose from a variety of built-in formats and templates. Even includes built-in Avery templates.

Professional-level mailing features...Fast, "On-The-Fly" operation, precise ZIP+4 demographic capabilities, fully integrated word processor and more. Don't mail without SuperBulkMailer+...

The Ultimate Postage Reducing System. SuperBulkMailer+ 1.0 is the only Fully Integrated Certified Bulk Mailing software available for the Macintosh® today. SuperBulkMailer+ is CASS

(Coding Accuracy Support System) certified by the U.S. Postal Service. By adding Zip+4, Carrier Route and Bar Coding to each deliverable address, our Software System assures that any business doing a mailing will obtain the lowest postal rates available. SuperBulkMailer+ also includes a built-in fully integrated Word Processor, Custom Label Generator, Custom Report Generator and all Avery® Label Templates. These features are all built into SuperBulkMailer+ 1.0, allowing you to access any of the many fields directly from your database with just a click of your mouse. SuperBulkMailer+ also has the ability to print all postal forms and stack tags for bulk mailings.



SuperBulkMailer+ allows the importing or exporting of any database from any platform with any delimiters. SuperBulk-

Mailer+ allows you to select the field order for importing any file. All of your import and export criteria can be saved and loaded back in when the export/import is processed again. Our system also allows for fixed length exports or imports. A powerful filtering system has been added to SuperBulkMailer+ 1.0 that will give the end-user the tool to filter out any delim-

iter in an ASCII file and replace it with another delimiter that they can use to import records into their own database.

SuperBulkMailer+ also performs 'On The Fly' parsing, standardization, Zip+4 coding, Carrier Route coding, and Bar Coding. As an address is entered into the field it is automatically corrected, parsed and standardized. Then enter in your Zip Code and the City and State fields are automatically generated. Or enter a valid Address and City/State, SuperBulkMailer+ produces the proper Zip Code, Zip+4, Carrier Route and Bar Code. This allows you to create a mailing list out of source books that do not give you Zip Codes, but do give you Zip Code information.

SuperBulkMailer+ has built in quick searches, custom searches, custom sorts, Nth sampling and other powerful tools used for selecting addresses to be mailed or printed. Searches and Sorts can be performed on any field in our database. The custom Search and Sort Criteria can be saved to disk, then loaded back in when needed again.

Build your own reports, labels, searches, sorts, imports and exports and save them to disk, or use one of our many pre-set Avery® label templates or built in reports. Logos and bar codes can be placed and printed on your labels, reports or word processing templates.

Zip+4 data used with SuperBulkMailer+ comes in two forms. Companies with local mailings can order the Zip+4 on diskettes. For statewide or nationwide mailings Zip+4 data is available on CD-ROM. Current Zip+4 and CRRT information is sent out on CD-ROM quarterly to keep mailing lists current.

SUPERBULKMAILER + 1.0

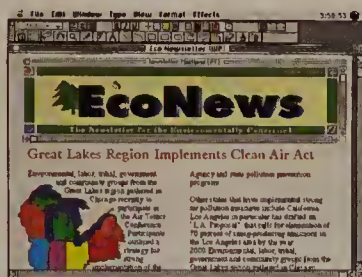
CAE2704 SuperBulkMailer+ \$620.00

The Integrated Package That's Truly Integrated.

Work With All 7 Programs At Once!
It's Seamless... It's BeagleWorks!

REVIEWER'S NOTEBOOK: *Beagle Bros. Software has consistently offered up some of the finest products we've seen for the Apple Computer. Each is clean, powerful and easy to use. Now, Beagle Bros. assembled a product that offers an integrated software program with seven modules. Beagle Bros. went back to the drawing board to create a new concept of integration, allowing users instant access to all information in the modules. Their efforts have produced In-Context Editing™, which links the word processor (with spell/thesaurus), spreadsheet, database, charting, drawing program, paint program and communications. This high level integration makes life very easy. Link documents and combine data from any of the individual modules into a single document and make changes without ever leaving that document. Feature for feature, BeagleWorks beats ClarisWorks, GreatWorks and Microsoft Works in every area we tested. It's the only one of the four that is System 7 SAVVY, so it takes full advantage of Publish & Subscribe, Balloon Help, TrueType, AppleEvents, Virtual Memory, 32-bit file addressing and color icons. An incredible value, ready-to-run for users of any expertise level. Great starter application that won't be quickly "outgrown."*

A new definition of integration. For example, you can actually combine information from any of the



seven modules into a single document. Or create new information in another module without leaving the module in which you are currently working. And with the innovative In-Context Editing, when information is changed in one document, the information in the linked documents changes with it. Automatically.

Publish & Subscribe information from any of the modules. BeagleWorks includes some powerful desktop publishing features like wrapping text around objects, setting multiple columns on and off anywhere on the page, and reduction and magnification as well as page preview in any module.

You'll love the full-featured Spreadsheet that allows you to create up to 256 columns and 16,385 rows. A powerful tool bar and time-saving recalc automatic summation features. The charting modules creates robust, 256-color line, bar, column, area, scatter and exploded pie charts. The database module allows 16,000 records per file, 256 fields per record and easy mail-merge. Sixty-four built-in functions are all at your command and BeagleWorks provides 32 report formats for your data.

Wanna' draw? Just pop open BeagleWorks' draw module and choose from a palette of tools, colors, patterns and line widths and shapes. The streamlined, tear-off menus make it a pleasure to work with. While you're in a creative state, zip into the paint module and get crazy with a host of spectacular studio tools — and some nifty special effects as well. Airbrush, spray can, paint bucket, pencil, line and more.

Provides 256 custom colors and 128 patterns.

When you're ready to connect your Mac to the world, BeagleWorks' communications module makes use of Apple's Communications toolbox to give you powerful connectivity! It stores commonly used phone numbers with a variety of convenient settings. Autodial, autoanswer, uses a modem or direct serial connection.

Word Processor: Automatically wrap text around objects; format in multiple columns; graphic ruler with tool bar for quick formatting; multiple headers and footers, custom styles and more; Microlytics® spelling checker and thesaurus.

Spreadsheet: Apply a different type style to any cell; create up to 256 columns and 16,384 rows; tool bar allows easy access to formatting.

Chart: Chart types include Line, Bar, Column, Area, Scatter, Exploded Pie and more; 256 custom colors.

Database: Manage databases with more than 16,000 records per file and 256 fields per record; mail merge with word processor; 64 built-in functions; up to 32 report formats of your data; tool bar provides easy access to formatting and alignment.

Draw: Tear-off menus for tools, colors and patterns.



BEAGLEWORKS

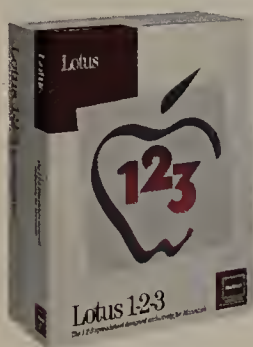
CAE2700 BeagleWorks \$184.00
CAE2701 Competitive Upgrade \$95.00

Upgrade to 1-2-3 – Just \$89!

REVIEWER'S NOTEBOOK: *The thoroughbred of Macintosh spreadsheets. Not a step-child of the original DOS product, Lotus 1-2-3 for the Mac has been designed from the ground up to exploit the power and flexibility of the Mac. Revolutionizing financial software with true 3-D worksheet capabilities: Excel doesn't have it, Claris Resolve doesn't have it. Fully featured, with System 7 support; completely customizable with desktop tear-off menus; most functions require just a mouse click. Excel users will be surprised at the power and grace engineered into Lotus 1-2-3 for the Mac.*

Lotus' deep understanding of advanced spreadsheet and financial modeling technology is present here. True 3-D worksheet management, incredibly nimble relational database power and easy-to-use formulas. Over 14 million people rely on the Lotus concept to create budgets, perform precise forecasting and instant analysis. Proposals and presentations ring with clarity with Lotus' financial graphs and tables. It's easy to edit cells, create graphs, and import data, using the same menus, tools and file formats across worksheets, graphs and macros.

Using 1-2-3 for the Mac is fast and simple. It embraces new System 7 and provides the classic 1-2-3 menu for complete keystroke compatibility. We love the use of floating toolboxes and palettes, allowing customization of your workspace. Moving around is silky and streamlined, allowing you to quickly select ranges (before or after starting commands). You get in-cell editing and the ability to directly manipulate chart elements. You also get 256 colors, 49 different fill patterns and 230 line styles and thicknesses for use in your spreadsheets.



Along with the brutal power of 3-D worksheets, you can easily customize database forms for automatics fill-in and printing, perform a host of advanced relational capabilities, including swift queries (a particularly useful feature), an ever-active macro recorder (an incredible time saver!), and automatic compression routines for any printer. By the way, Lotus throws in a free copy of Adobe Type Manager.

With 1-2-3 for the Mac, complicated tasks, like consolidations, don't require tedious linking or endless dialog box activity, just a couple of mouse clicks is all it takes. Easily bring remote data right into 1-2-3 through DataLens and the Apple Data Access Language. Read FoxBase and dBASE files directly.

Lotus 1-2-3 for the Mac towers over the capabilities of Excel in a host of areas. Its ability to perform true 3-D functions is an enormous advantage. And the spectacular range of colors and graphic devices available within the worksheet. Excel doesn't allow pop-up functions or range names, Excel doesn't allow you to directly manipulate elements in charts, or perform in-cell editing Lotus 1-2-3 for the Mac does. Excel doesn't include relational capabilities, floating toolboxes or palettes, you can't customize your workspace or have your macro recorder on all the time. 1-2-3 does.

When it comes to spreadsheet features, no one even comes close to 1-2-3 for the Mac. That's because only Lotus has engineered true 3-D worksheet power into 1-2-3. Excel users are converting in droves to the newest, hottest spreadsheet product,

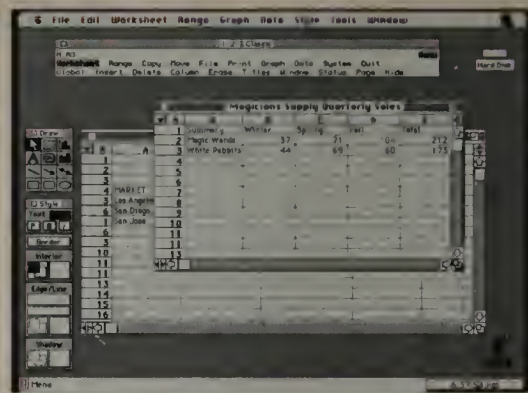
finding features like relational joins and queries, the 1-2-3 Classic menu for 100% keystroke compatibility, vast color and graphics support and a dozen other advantages. In fact, we've compiled a feature-by-feature comparison for your review. But there's an intangible difference: The proven 1-2-3 approach to the worksheet. Just the feel of the in-cell editor, pop-up functions and macros display the refined Lotus functionality. John Sculley, CEO of Apple says "...This is a spectacular product" And MacWeek raves: "The most impressive aspect of the program is its implementation of the Macintosh interface. Mac aficionados will have no problems with the program — 1-2-3 Mac is a Mac application to the core." The numbers have never looked so good...

More Powerful Than A Locomotive. True 3-D worksheet management lets you tackle complex tasks, without complicated linking or dialog boxes. Bring remote data right into Lotus 1-2-3 through DataLens® and the Apple Data Access Language. Then work with it using full relational database power and custom database forms. No matter what you're doing, you'll see only one set of menus, tools and file formats. You'll get so much done with so little to learn.

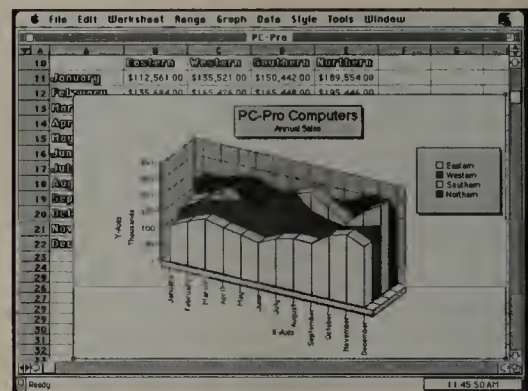
No Mac Is An Island. Share files, macros and applications with Excel users? With PC users? Yes. You heard right. 1-2-3 for Macintosh directly reads and writes Microsoft® Excel for Macintosh files. So you can make the switch to 1-2-3 and never look back. What's more, 1-2-3 for Macintosh is fully compatible with all 1-2-3 files and macros, including PC versions. More than fourteen million people already rely on Lotus 1-2-3 for accounting, budgeting, forecasting, analysis, proposals, presentations and much more. Now Mac lovers can, too.

See How The Newest Macintosh Spreadsheet Stacks Up.

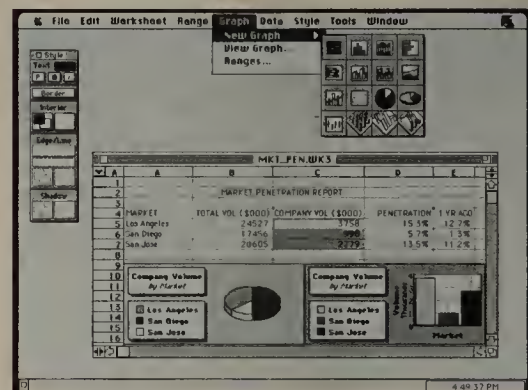
Features	Lotus 1-2-3 for Macintosh	Microsoft Excel 3.0
Optimized for Macintosh		
• Supports system 7 features	Yes	Yes
• Floating toolboxes and palettes for custom workspace	Yes	No
• Directly manipulate chart elements	Yes	No
• In-cell editing	Yes	No
• Context-sensitive, graphical help	Yes	No
• Select ranges before or after starting commands	Yes	No
• Supported colors/fill patterns/line styles and thicknesses	256/49/230	16/18/32
Powerful Spreadsheet Features		
• True 3-D worksheets	Yes	No
• Pop-up functions and range names	Yes	No
• Menu promotion	Yes	No
• Same menus, tools, and file formats across worksheets, graphs, and macros	Yes	No
• Adobe Type Manager included	Yes	No
• Automatic compression on all printers	Yes	No
• Macro recorder always active	Yes	No
• Customizable database forms	Yes	No
• Relational joins and queries	Yes	No
• Directly reads FoxBase and dBASE files (.DBF)	Yes	No
Compatibility		
• Reads and writes all 1-2-3 files	Yes	Yes
• Runs all 1-2-3 macros without translation	Yes	No
• Reads and writes Excel files	Yes	Yes
• 1-2-3 Classic Menu provides keystroke compatibility	Yes	No



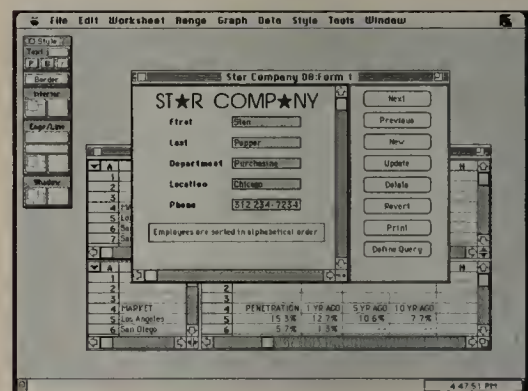
"Classic" 1-2-3 menus work the same as the 1-2-3 everyone knows and loves. (Or use the standard Mac menus — your choice.)



Only 1-2-3 has true 3D-Worksheets. Perfect for linking Profit Centers and multiple departments.



Fantastic charting including 2-D and 3-D charts in numerous styles and types — all available with the click of the mouse. And only 1-2-3 has floating toolboxes for ease-of-use.



Turn your spreadsheet into a database. The benefits? Easy data entry using forms that practically fill in themselves!

ORDER YOUR COMPETITIVE UPGRADE TODAY!

If you are a current 1-2-3 user, you are automatically eligible. If you use Excel, Claris Resolve or another competitive spreadsheet, you too are eligible.

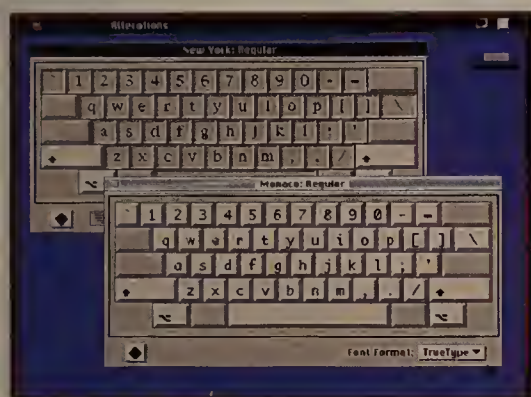
LOTUS 1-2-3 MAC	
CAE2485 Lotus 1-2-3 Mac	\$325.00
CAE2486 Lotus 1-2-3 Mac Upgrade	\$89.00

Enhance And Modify Your Fonts With Amazing Results!

REVIEWER'S NOTEBOOK: Now anyone can get typographic-quality effects and enhancements using their existing type, with FontMonger, the super fast, simple-to-use type customizer. Modify a wide range of your type's characteristics, including the ability to merge individual characters to create custom faces. Modify existing typefaces into all small caps and use characters you've never been able to access before.

This easy-to-use utility can save you hundreds (or even thousands) of dollars by converting PostScript Type 1 (for use in Adobe Type Manager) and Type 3 fonts to the advanced new TrueType format.

Here's another fascinating FontMonger capability: you can actually merge characters from several font families, to create unique small caps, composite characters, customized faces and logotypes.



Combine typefaces, remap keyboard characters or convert between type formats.

FontMonger also offers support of Adobe Illustrator and Aldus Freehand files. You can create or modify characters within programs and build these modified characters back into a font. It's fast, easy and very handy when using multiple programs. FontMonger's type modification tools provide a vast assortment of intriguing capabilities including: access to unencoded characters, creation of oblique characters, generation of superscript and subscript characters along with generation of slash and bar fractions (some of which have been previously hidden, others you probably never knew you had).

Using FontMonger, you can convert fonts one face at a time, as you need them, or in batches so your entire library is at your service. Just one step converts the batch. In addition, you can control the character widths of your fonts (the space between characters) the horizontal and vertical scaling, the slant and character width.

Outline Fonts. Outline fonts that describe the lines and curves which make up their characters. They can be used to draw characters at any size on any screen or printer. With the arrival of Adobe Type Manager (ATM) and Apple's System 7.0, you can now use outline fonts throughout your Macintosh system. Fonts you use this way must be in PostScript Type 1 format for ATM, and in TrueType format for System 7.0.

TrueType. The TrueType font format was developed by Apple for System 7.0. The format has been adopted by Microsoft for use with Windows.

Type 1. Before 1990, only Adobe could produce fonts in PostScript Type 1 format, so if you wanted to



use ATM you had to buy Adobe fonts. Now, the Type 1 font specifications are publicly available, and you can buy Type 1 fonts from many vendors.

Type 3. Until the Type 1 format was made public, non-Adobe PostScript fonts were in the less-capable Type 3 format. Type 3 fonts are usually slower to print, produce lower-quality results and do not work with ATM. You may never need to convert any fonts to Type 3 format with FontMonger (although you can). Instead, you will probably want to convert Type 3 fonts to Type 1 and TrueType formats.

ARES FONTMONGER

CAE2415 FontMonger \$59.95
Requires Macintosh Plus or newer; 1 MB of memory; two floppy drives or a hard disk; System 6.0.2 or later

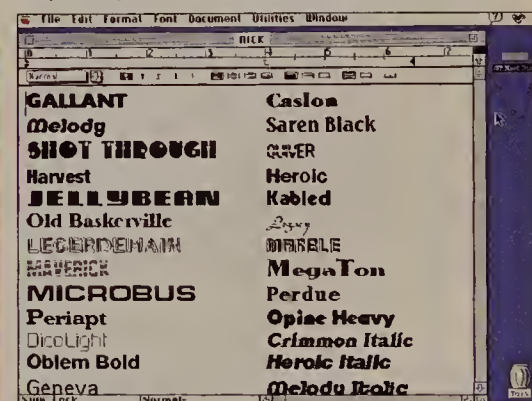
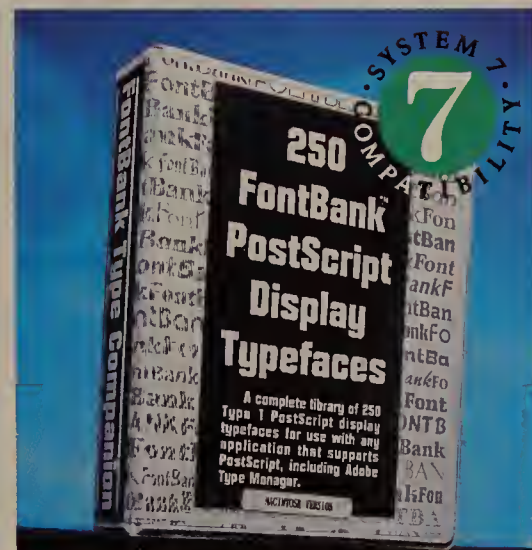
PostScript Fonts For Just 40 Cents Each?

REVIEWER'S NOTEBOOK: What's wrong here? Was that a typo in the headline or has TigerSoftware lost their minds? No typo. No mind loss. Just a great value on a complete (and we mean complete!) library of 250 Type 1 (the best) display faces for use with any application that supports PostScript (including ATM). You already know the value of great looking type in your documents. Now great type costs less. These faces can be used with more than 4,000 Macintosh applications and run beautifully with all Macs. Includes screen fonts as well as printer fonts. Why pay more for foundry-quality type?

Type 1 PostScript fonts — the best you can buy. Smooth and crisp on the screen and on the page. The standard for Macintosh and adopted by Microsoft for Windows. Buy them from Adobe and pay through the nose. Or, take advantage of FontBank's staggering array of quality fonts at down-to-earth prices. You'll create attention grabbing documents and eye stabbing graphic elements for any graphics programs and desktop publishers. With such a wide variety of faces available to you, creating incredible headlines is fast, fun and amazingly professional. The headline is the face of good advertisements. Wimpy headlines are usually ignored, while bold headlines attract the reader, and if your message is important, the casual reader becomes curious — and persuaded. Remember, though, that headlines must be legible. If you'd like to know more about working with display

faces and creating winning headlines, call TigerSoftware and ask for a free copy of a 24-page book that we've prepared entitled "A Short Course On Working With Type." It has been prepared by the typographers at Tiger and we'd be happy to get one in the mail to you.

FontBank has assembled a vast array of looks and feels in their type library. 250 different faces, each with its own distinct character. Some you may never have seen before. And FontBank display faces can be easily manipulated with programs like TypeStyle, Adobe Illustrator, Aldus FreeHand and others. Combining FontBank's 250 faces with the capabilities of these programs offers the opportunity for an unlimited number of special effects. And FontBank display faces are compatible with all major page layout applications like Quark XPress, PageMaker, DesignStudio, Multi-Ad Creator and others.



Just a sample of the FontBank library of pro-quality Type 1 typefaces. Each is smooth and clean on screen — and on paper!

FONTBANK

CAE2425 FontBank \$95.00
Can be used with any Macintosh.

Take Your Information With You!

REVIEWER'S NOTEBOOK: Dynodex — *The Real Contacts Database is an incredibly full-featured address book database manager. Includes both application and desk accessory versions. Allows you to print address books for virtually all popular-format personal organizers (including Filofax®, Franklin®, Time/Design®, Day Runner® and the ever-popular Day-Timer®). You can also create custom designs and sizes for whatever purpose you can imagine. Dynodex's data entry screen is well organized, fast and gives you 22 fields (all user-renamable).*

DynoPage turns your Mac into a printing press, allowing you to print any file — as a booklet! Just print, fold and staple! You can print pages that fit perfectly into your personal organizer, print multiple pages to a sheet (dozens of layouts are built right in) and print any file in double-sided format.

With Dynodex and DynoPage, you've got the most sophisticated, easy-to-use tandem of personal organization tools in the business. In fact, they're so perfect together, TigerSoftware has arranged to bundle them and offer them to our readers for just \$99! It's a steal! And if you purchase this exclusive bundle, we'll even throw in a FREE copy of Super Glue II, an incredible program that allows you to easily transfer graphics created in Excel, MacDraw, MacPaint and Microsoft Chart to MacWrite, Microsoft Word, ReadySetGo! and PageMaker. It's a \$119



value! PLUS — if you use Touchbase, InTouch, Address Book Plus, QuickDEX, My Advanced MailList, Add Phone, MacPhonebook or Day-Maker — you're eligible for a special competitive upgrade price on Dynodex of just \$49!

Dynodex and DynoPage have won industry acclaim for their masterful printing and easy-to-use operation. They stand far above the rest in productivity, organization, portability, connectivity and security.

Dynodex is a true personal organizer, capable of handling names, addresses, phone numbers, notes and all other important information — and allows you to print perfect double-sided address book pages that fit virtually any manufacturer's books.

You'll never lose your address book (that could be a disaster!); because you'll always have a backup right on your computer. Instantly look up and dial any number you need from the powerful Dynodex database — or the convenient desk accessory. Never waste another minute looking up a name or dialing a wrong number. Dynodex gets you the information you need fast.

The powerful Dynodex database delivers ultra high speed searches: instantly select subsets based on multi-level queries with a set of eight logical and arithmetic operators; for example, "all clients in California contacted within the last 6 months." On sort-

ing: you get 3-key, ascending or descending on any field, along with Dynodex's speedy find, change and global delete. You can delete duplicates, Fast-Find and display any record instantly by simply clicking on it in the list window.

If your information resides elsewhere, Dynodex allows you to quickly import it for immediate use. Any text file, tab-delimited or comma-delimited file is ready to use, and Dynodex includes a free copy of DynoStack, for importing HyperCard, Focal Point and QuickDex address files.

On to Dynodex's powerful (and very smart) printing capabilities: You can print any size address page, even double-sided pages. Print in any font, size and style on a field-by-field basis for great looking pages. You can set Dynodex to break pages on a new letter of the alphabet or print continuous listings. Dynodex also prints beautiful pages on DynoPaper, specially designed micro-perfed paper available in a variety of colors and punched-hole configurations to fit your favorite personal organizer. You can use Dynodex to print envelopes, postcards, Rolodex® cards, mailing labels and Post Net bar codes, too.

Dynodex 2.0 Wins MacWEEK Target Award

Editors Call It "Best Overall Choice" In
Contact Management Category

In choosing Dynodex 2.0 as an award recipient, MacWEEK's editors wrote: "Dynodex significantly edges out the competition in performance, especially with larger address lists. The program's strong points include a streamlined interface, complex phone-dialing capabilities, versatile import and export features, and a thorough and well-written manual. It also offers unparalleled printing versatility, including support for address books, labels, envelopes and rotary-file cards. While different address utilities target different user needs, Dynodex 2.0 is the best overall choice for management of names and addresses on a daily basis."

ALSO AVAILABLE: DynoPage and DynoPaper.

DynoPage is the incredibly useful utility that actually allows you to preview and print ANY Macintosh file on any size page, single- or double-sided. Create a center-stapled booklet from any file, or print reports, maps, charts, spreadsheets or other documents to DynoPaper sheets that fit perfectly into your Day-Timer or other personal organizer.

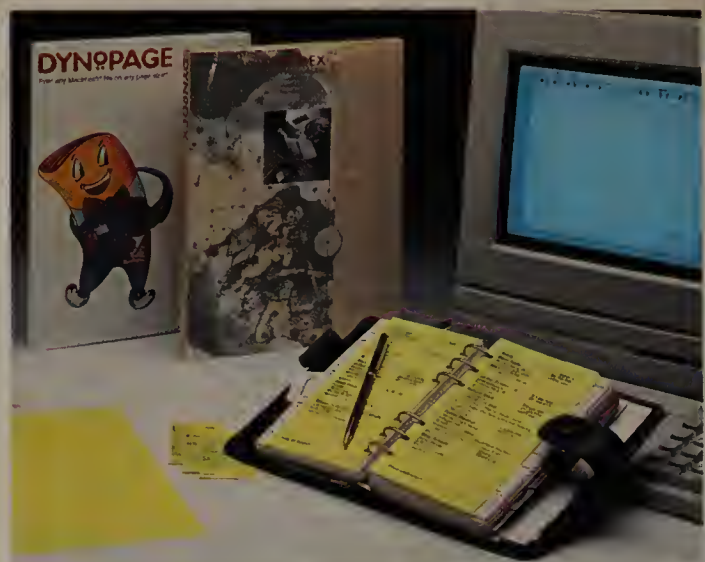
DynoPage prints in a variety of useful configurations, and comes complete with 40 sheets of Dynodex Instant Address Book Paper (six-ring along with half-page), dozens of pre-designed layouts, a comprehensive manual brimming with tips and techniques and a valuable coupon for big discounts on personal organizer products. Here's a look at what you'll be able to create with DynoPage:



FULL PAGE: Print any file to double-sided pages and preview any document. See it on the screen as it will print!



HALF PAGE: Desktop publishers love this great DynoPage feature. Just print and fold and you've got an instant center-stapled booklet.



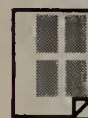
FOUR "UP": With this convenient feature, you can quickly print greeting cards or mini-booklets. It's also perfect for archiving your printouts.



TRIFOLD: Allows you the flexibility in any columnar layout. Prints both portrait and landscape modes with just a click! Great for brochure layouts!



THUMBNAIL: Here's a very helpful feature for long document previews. Print thumbnail reductions to see an overview of your pages.



INDEX CARDS: Print absolutely ANY size form including index cards, postcards, change of address cards — and hundreds of other possibilities!



DYNODEX 106: Print to absolutely any six-ring organizer including the popular Filofax and Day Runner (paper included).



DYNODEX 120: Print to absolutely any half-page organizer and create insert sheets for products from Franklin and Day-Timer (paper included).



DAY-TIMER SR. POCKET: Print to this or absolutely any other organizer system. DynoPage includes dozens of pre-designed layouts to fit your needs.

DynoPage is fast, easy and truly productive, allowing you to create mini-pages for your organizers, appointment books and calendars. Print booklets, manuals, trifold brochures and more.

Positive Response from Users & Reviewers

DynoPage already has high marks from users and reviewers. Macworld said, "...if you ever need non-standard pages, thumbnails, double-sided pages, or other unusual printouts, DynoPage has no equal."

Jean-Louis Cassée of Be Systems has said "If you have an organizer, you have to have Dynodex & DynoPage."

TIGER EXCLUSIVE DYNODEX COMPETITIVE UPGRADE \$49.00

PORTFOLIO SYSTEMS

CAE2823 Dynodex w/FREE Super Glue II	\$70.00
CAE2824 DynoPage w/FREE Super Glue II	\$58.00
CAE2442 DynoPaper (white, cream, gray, yellow)	\$14.00
CAE2825 Dynodex/DynoPage Bundle w/FREE Super Glue II	\$99.00
CAE2826 Dynodex Competitive Upgrade	\$49.00
<small>Macintosh Plus, SE series, II series, or Portable; System 6.0.3 or later.</small>	

Get Your Priorities Straight!

REVIEWER'S NOTEBOOK: *First Things First* is an award-winning time management utility that has no learning curve — it's immediately useful right out of the box. It puts up a unique Floating Clock-Icon, which stays "on top" regardless of how crazy your desktop gets. It not only always tells you the time and date, but also provides instant access to ToDo lists, to check your schedule, or to set up a Reminder. Just double-click on it, or use the program's built-in hot key, and you are managing your time without wasting any of it.

Not only do you not have to find a menu to launch it, *First Things First* is lightning fast, much faster than a normal desk accessory. In and out and back to work in a flash. This program is designed to help you stay focused on your work not your schedule. We can't really manage time — it flows on relentlessly — but we can do something about our priorities!

Features an excellent Priority Feature that allows you to assign priority levels to tasks, appointments and events. By assigning these priorities, you'll attack each day with an organized plan. View various levels of priority, focus in quickly on what needs to be done. Another great feature is the monthly calendar, which works in seamless conjunction with the Reminders and Things To Do capabilities.

Perfect timing. It's either the result of incredible luck or determined effort. In business, however, you can't always depend on luck. That's where *First Things First* comes in. The premise is that even the

most organized people have trouble keeping track of all the things they must (and want to) accomplish.

Sound familiar? Time-dependent tasks, appointments and

deadlines simply don't care if you have enough time to organize them. And unless a time manager is fast

and easy, it is of little use. *First Things First* is extremely easy to use, delivering instant access to your list of tasks and details. It allows you to organize your efforts by category or project, and keeps you in touch with the big picture even in the wake of interruptions, crises and priority shifts.

You'll quickly create categories, establish reminders and things to do, view and print your lists and have almost unlimited capabilities to customize *First Things First* to fit your personal style. That's important.

The Floating Deskclock is an access device unique to *First Things First*. In its 3-dimensional form, it actually decorates your screen. Or, if you like, you can park it in a reduced form in the menu bar. Either way, you just double-click on it any time you want to access your time management program. Nothing could make more sense from a user's point of view!

Printing is a snap. And *First Things First* gives you complete control of your output, with a variety of styles and fonts. Print just the items within a time range — or your entire weekly schedule. Creating Reminders is simple — just click on "New Reminder" and enter the text for your Reminder. You then choose a Category for your Reminder and set the time and date that you want to be reminded. If you want recurring reminders, just check a box and you'll get a Reminder each day, week or month at the same time. Viewing Reminders is as easy as clicking the Reminder icon. Choose overdue Reminders, Reminders that are due today, this week, this month, all uncompleted Reminders at once or completed Reminders. Edit reminders to accommodate your ever-changing schedule. If a project's completion date is moved up, you can quickly adjust all related reminders to reflect that change.

Create multiple Reminders for yourself and a floating InBox icon will pop up on your screen to flash when the reminder comes due. Click on the icon, or use your FTF hot key, and up come your Reminders. The floating icon technology offers the perfect level of effective attention-getting without being disruptive to work being done. If you'd like, just "snooze" the Reminder to later in the day, tomorrow or next week. And speaking of snoozing, if you snooze a recurring Reminder to a time later than the next occurrence, *First Things First* will skip the next



occurrence and give you a regular Reminder at your snooze time. It continues regular Reminders after that. For example, you might have a Reminder that recurs every day at 10:00 AM. One day you might snooze your daily Reminder until noon the next day. The next day, *First Things First* will skip your 10:00 AM Reminder and give you a Reminder at noon. After tomorrow, your Reminder goes back to the 10:00 AM schedule.

First Things First also allows you to set the sounds you'd like to hear when Reminders are due, or to signal the top of the hour. You can choose to turn them off too. When a Reminder is due and the sound is off, the icon still flashes.

Priority Power!

- **Setting Priority when creating New Things To Do.** With Version 2.0 you can easily set one of four priority levels by simply clicking on 1 through 4 when creating a new item.
- **To Do Items listed with priority number.** To Do items are listed in the main dialog box and are preceded with a priority level number (1-4) positioned in a 3-D box.
- **View by Priority — a whole new dimension of power!** A fourth pop-up menu at the top of the main dialog box lets you view Things To Do by Priority Level (Priority One only, Priority 1-2, 1-3 and 1-4) as well as by Category and Timeline.
- **Priority One splash window to stay focused!** Anytime you want, you can do an Option/Click on the clock and have *First Things First* pop up a window that only includes your Priority One items for today! This is an incredibly powerful way to stay focused on the most important things to do!

Customizable Time Range. New Version 2.0 offers you the ability to customize the time range of the tasks and reminders viewed. Easily call up a dialog box to input the start and stop date.

Import/Export — Great for Mac Portables. Version 2.0 offers flexible options for converting personal information data from other programs into *First Things First* and exporting to text formats or to update other *First Things First* data files.

MUG News Service, the internationally syndicated information resource for 2000 Macintosh user groups worldwide, has selected First Things First as Mac Utility of the Year.

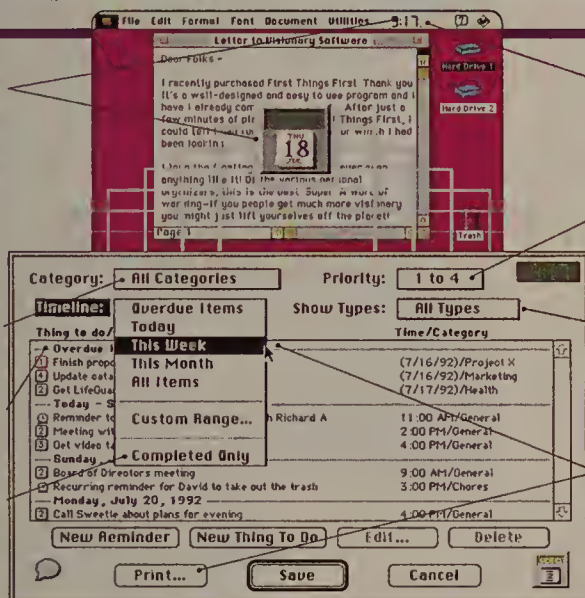
The Simple Power Of First Things First

An attractive clock-icon floats on top of any window or application, wherever you put it. Or you can simply make it a digital menu bar clock. Either way, just double-click to tap the instant power of *First Things First*!G

Pop-up menu lets you create, edit or view up to 20 categories for managing multiple projects.

Until rescheduled, overdue items are always listed first.

This option would show what's been accomplished in different categories.



Under System 7 balloon help is available. (Runs on System 6.0.4 or later.)

You can choose to view only the priority levels you want to see.

You can choose to view only tasks or reminders using this pop-up menu.

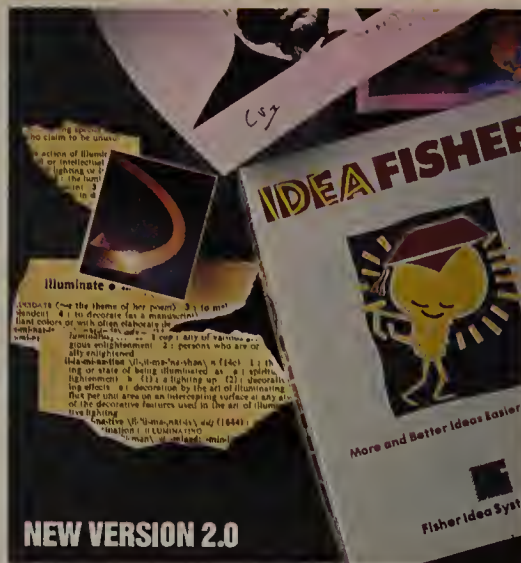
Choose any time at a glance you want. Print any view.

VISIONARY SOFTWARE
CAE2403 First Things First 2.0 \$49.00
Any Macintosh with at least 1mb of RAM and System 6.0.4 or later.

Everything Begins With A Great Idea...

REVIEWER'S NOTEBOOK: *It is a rare and valuable individual who can consistently come up with great ideas. Whether it's to solve a problem, build an effective business plan, create an advertising campaign or position a product. The fact is, there's no substitute for original thinking. IdeaFisher is a unique software product that actually helps you generate high-potential thoughts. It's not magic; it is designed to help you identify relevant issues, examine new perspectives and analyze existing information. It directs you towards associations between words and questions, and adds analogical reasoning (analogy and metaphor) to unearth new avenues of thought. Use it once, and you'll unlock the potential of your inner creativity, a power that everyone possesses, but only a few ever truly cultivate.*

IdeaFisher is the brainchild of Marsh Fisher, co-founder of Century 21 International Real Estate Company. It is a 7 megabyte computer companion for high-powered brainstorming sessions that helps you trigger new ideas. Innovative ideas, from your memory, sparked by dynamic association. It is composed of two distinct databases: QBank and IdeaBank. QBank contains nearly 6,000 questions to clarify, analyze and solidify your thoughts. When you answer questions posed in QBank, IdeaFisher generates key concepts to explore in IdeaBank. IdeaBank contains 61,000 words and phrases, 387 topical categories and 28 major categories. Its cross-referenced system provides you with over 700,000 associative links. These two sets of data link to stimulate convergent and divergent thinking, reminding



you of images, facts and feelings. In all, these mental connections open the door to millions of idea-associations. IdeaFisher becomes a pipeline to rich imagery and creative solutions lodged within your memory and subconscious. Again, IdeaFisher isn't magic, it's a crowbar that loosens your own inner originality.

The IdeaBank is the "Idea Base" in which information is organized as your mind would organize it, into clusters of associations. The categories included are: Actions/motions, Agriculture, Animals, Business/industry/occupations/money, Clothing/jewelry/grooming, Colors, Communication/education/the arts, Comparison, Emotions/behavior/personality, Energy/technology, Containers/storage, Foods/cooking/eating, Government/law/politics, ... and dozens more.

IdeaFisher helps you tap your own resources,

based on the powerful stimulus of language, association, memory and knowledge. That's the secret here. The more you explore a concept, based on your review of associated words and phrases, the more original thought will be uncovered. In fact, Linus Pauling's research on the subject states that the more ideas you can generate, the more likely you are to produce an excellent one.

Further, research has shown that the most innovative solutions tend to be found among the last 50% of all the answers generated on the topic, while the most obvious, unoriginal ideas tend to appear in the first 50%. That second 50% (containing the excellent idea) is often buried in our subconscious: our memory. That's why techniques of creative thinking cannot overcome one simple obstacle: our inability to remember everything we know.

IdeaFisher is in use today in marketing firms, corporations, engineering and planning firms, ad agencies, schools, law firms and everywhere that ideas can make a difference. Many of today's successful writers, inventors, trainers and students use it to enhance their creative thinking skills. Using IdeaFisher, you can develop new products or services, develop names for products, position products, develop strategies, create advertising campaigns, design procedures, policies and group objectives. Writers use IdeaFisher to develop story, script and article ideas, write speeches, jokes or even legal briefs. Trainers use it to assist in counseling and personal growth skills, as well as to help students to organize thoughts and projects.

FISHER IDEA SYSTEMS

CAE2435 IdeaFisher	\$385.00
CAE2436 Strategic Planning Module	\$65.00
CAE2437 Presentation Planning Module	\$49.00
Macintosh Plus, SE series, or II series with 1MB RAM and 7MB of hard disk storage.	

Compress Files And Folders Up To 98%!

REVIEWER'S NOTEBOOK: *StuffIt Deluxe 2.0 is the latest utility from the mind of famed programmer Raymond Lau, and is already an industry standard in compression and archiving. Many national (CompuServe and GEnie) bulletin board files are "Stuffed" and can be accessed through StuffIt Deluxe. It's faster, easier and more competent than any other compression utility we've tested, and includes a slew of state-of-the-art features: a new intelligent compression option, the ability to create self-UnStuffing archives and automatic launching of compressed application or documents. You'll save some serious disk space, while giving yourself complete file manipulation control, the ability to open multiple windows, move, copy, sort, rename and delete archived files — even add password security! By compressing files, you also save modem transfer time. Put the Magic Menu Extension in your System Folder and watch a new menu appear in the Finder. Now Stuff and UnStuff files and folders from within the Finder. There's even built-in virus protection.*

If you're not using a compression utility, you're leaving valuable disk space on the table. And if you're not using StuffIt Deluxe, you may be missing out on a wide range of helpful tools.

StuffIt Deluxe features a new QuickStuff command that brings up a dialog box — you simply choose the file or folder you want to stuff. StuffIt Deluxe then instantly creates an archive and stuffs your files. QuickUnStuff is just as easy — just select the

files and it's done! There's also a Control Panel file — Magic Menu — that places a menu called Magic in the Finder. Just select the files or folders you want stuffed — right from your desktop, and without opening StuffIt Deluxe! Incidentally, Microsoft Mail and QuickMail users can stuff and send their E-mail files without actually using the E-mail software.

If you're like most users, you'll adopt StuffIt Deluxe as your main backup program. The extensive, Finder-like operation allows you to actually open multiple archives and move files between them. And only StuffIt Deluxe provides an easy-to-use scripting language to automate your archival procedure.

Also From Raymond Lau...

New SHORTCUT. How would you like to put all of the files and folders that you use all the time onto one menu? Now you can — quickly and simply with new SHORTCUT, the ingenious disk management and file/folder navigation utility that appears within every application.

Using SHORTCUT means that you'll never have to conduct all-out searches for files or folders again — just a mouse click finds whatever you need. By placing a pop-up menu in each application's directory dialog box (a.k.a. Open and Save dialogs), SHORTCUT instantly gives you the ability to "Fast Find" lost files and jump between files and folders. And if you're a StuffIt Deluxe user, SHORTCUT gives you transparent access to StuffIt Deluxe archives. These compressed archives appear as regular folders on your disk. Just

double click on a file in an archive and it's instantly decompressed and ready to go!

SHORTCUT is straight forward, simple and powerful. You can create new folders without using the Finder, rename, delete and lock files and folders, quickly see vital information on files, view text and PICT documents from within any application (even if the application doesn't support them!), and more. The powerful Find command allows you to perform searches with blistering speed by just typing any part of the document name or folder name. You can even customize SHORTCUT to your own needs in just seconds from the Control Panel.



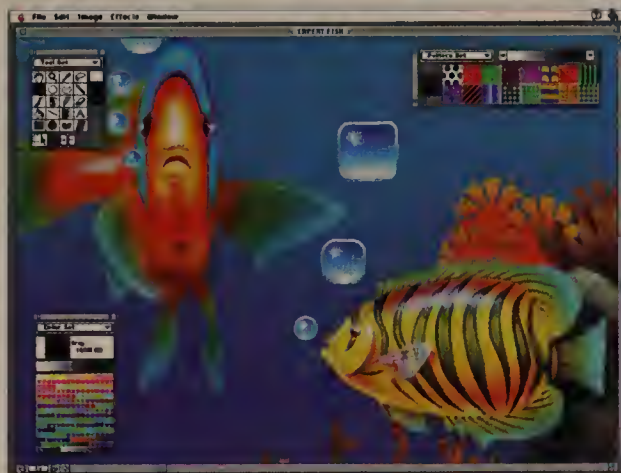
STUFFIT and SHORTCUT

CAE2420 StuffIt Deluxe 2.0	\$62.00
CAE2421 SHORTCUT	\$45.00
Any Macintosh computer with a hard drive running System 6.0.2 or later with at least 1MB RAM.	

The 32-Bit, 16.8 Million-Color Paint Program That Costs Just \$27.95!

REVIEWER'S NOTEBOOK: *It's hard to imagine that a paint program with true 32-bit color and a palette of 16.8 million colors, plus an extensive toolbox of creative features can sell for just \$27.95. But a few minutes with Expert Color Paint and you'll know that it's true. Expert Color Paint brings professional-quality paint and photo preparation down to earth with one of the most feature-rich, easy-to-use products we've ever seen. This one is fast, fun and loaded with all the extras — including System 7 support. Compare Expert Color Paint to MacPaint (at \$125), UltraPaint (at \$199) and SuperPaint 3.0 (\$199). Feature for feature, you simply can't beat this low-cost, high performance art attack! Throw in a free disk packed with quality clip art (a \$24.95 value) and it's the most irresistible offer we've ever made!*

Frunkly, the high-priced paint products are a little embarrassed. They've been telling customers that a paint system has to be expensive to be good. And while that may have been true in the past, the wall has come down. Expert Color Paint is a powerful, yet simple-to-use product that produces great looking images, just like the pricey packages, and adds a studio-full of advanced toolbox features, such as



lasso and magic wand, gradient tools, dropper, air brush, paint can, a host of patterns and more.

For image editing, there's blur and sharpen, distort, skew, brightness filters, contrast control, image scaling, paint dithering, antialiasing (smoothing), rotate, flip, stretch and slant. There's even a life-saving "multiple undo" feature. You can customize your tools, retouch photos for pro-quality results and create extraordinary gray scale images in no time.

Those other paint programs told us that paint programs should be difficult to use — but that's not true anymore, either. In fact, working with Expert Color Paint's sleek menus and streamlined tools gives you complete control — without the learning curve. Retouching photos is fast and easy. Expert Color Paint is like having a darkroom right on your Mac, with a

host of creative options at your fingertips, more than some full-blown photo-manipulation programs! And incorporating special effects is a snap.

When you're done, save your pictures in one of several popular formats, or easily publish them to other System 7 programs. And Expert Color Paint will use virtual memory, so massive color files (with as many colors as you want) are never a problem.

Although Expert Color Paint is bursting with riveting color, it's also a pro-quality tool for creating impressive black and white images as well. And when you're ready to print, Expert Color Paint provides vast support for ImageWriters, StyleWriters and LaserWriters — even Linotronic and AGFA Compugraphic printers. Sorry, SuperPaint, MacCheese, UltraPaint and MacPaint, Expert Color Paint is more — for less!

- ✓ Expert Color Paint is a simple yet powerful color paint program with many extras including 32-bit color and image editing.
- ✓ The fully loaded tool palette includes adjustable Brushes, Magic Wands, Air Brush, Paint Can, Patterns, Text and more.
- ✓ Includes professional editing features like Blur, Sharpen, Brightness, Contrast, Rotate, Stretch, Slant, Anti-aliasing and Dithering.
- ✓ Support for QuickDraw and PostScript printers.
- ✓ Extra Bonus! Clip Art Disk, a \$24.95 value included FREE!

EXPERT COLOR PAINT

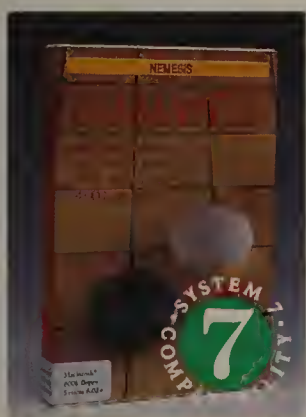
CAE2505 Color Paint **\$27.95**
Requires Macintosh SE/30, LC, Macintosh II, IIfx, IIfx, Classic II, PowerBook 140, PowerBook 170, and Quadra families (68020 processor or above) with 2 MB RAM and a hard disk; System 6.0.5 or later and 32-bit QuickDraw; 8 bit video card recommended.

The 4,000 Year-Old Game Of Abstract Reasoning.

REVIEWER'S NOTEBOOK: *While most of today's popular computer games feature eight-headed dragons, impenetrable Soviet tanks or playful green cosmic blobs, Go is a simplistic Japanese tradition that challenges the mind on the most basic level. It, indeed, mirrors the logic, philosophy and personality of the player, stirring the inner self and demanding intense concentration. Fascinating and addictive, you'll learn to play in minutes and spend the rest of your life mastering it.*

Here's how you play Go: Two opponents alternately place black or white stones on the vacant intersections of a 19 by 19 grid-board, attempting to surround empty points and thwart one another. The player with the most enclosed intersections wins.

Unlike chess, which requires superior technical mastery to defeat an opponent, Go requires players to combine vision and logic. And while both games demand a strategy, decisive attacks and a solid defense, Go allows weaker players to compete evenly with a unique hand-



icapping system.

An interesting characteristic of Go is that the entire board may not look the same as it did on any previous turn. Since you add stones during each turn, there are only rare instances where the board could look the same. And unlike chess, which ends in a draw if the board repeats often enough, Go requires that you do not repeat.

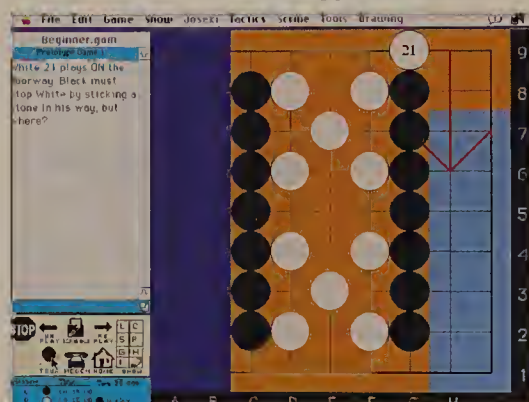
Most Go games have three distinct phases: The opening, in which players establish the areas of the board that they hope to control; the midgame, where players strengthen and extend territories, while attacking the opponent (most games are won in this phase); and the endgame, where players fill neutral points and solidify their positions.

Timing and planning are critical. Players must judge when to create complete boundaries for the territories they've captured or risk being attacked at any time. When to reinforce a territory and when to attack (or defend an attack) is a matter of precise timing. Defending a position too soon will hurt your efforts to expand, while a late defense will allow an opponent to destroy your position with little or no loss. Your strategy will dictate whether to begin your conquest at the corners, on the sides or within the center of the board (HINT: the 3rd and 4th lines from the edge represent the most efficient play).

Once you begin playing Go, you'll understand the intellectual challenge that underlies the simple appearance. It's much deeper than any game you've ever played and much more rewarding than pulverizing a fleet of visitors from another planet!

Go Master Deluxe. Take your Go experience to the limit with the ultimate level of play. Go Master assists your planning with battle maps revealing stones and groups needing defense, territorial control for each player, or even 10 recommended plays. Go Master Deluxe includes Nemesis Joseki Genius and Neme-

sis Tactical Wizard, two grand master tutors that guide you to the peak in Go skills. Joseki gives you sequences of moves culled from centuries of play by the masters. By learning strategies of organized moves, and using joseki techniques in your play (it aids both players equally), you'll quickly develop skills that will make you a dangerous opponent. Includes on-line introduction on the joseki theory. Nemesis Tactical Wizard is your advisor as you play, consulting you on what to do in life-and-death confrontations with the enemy. Also includes Nemesis Scribbler, the documentation utility for your Go matches. Complete annotation capabilities for the serious Go student and advancing player.



The ancient Japanese game of Go: Two opponents place their stones on vacant intersections of a 19x19 grid, attempting to surround empty points and thwart one another. This game requires strong strategy and intense concentration. Available as just the game or Go Master Plus, complete with tutorial, time-tested strategies, and a host of sample sequences.

NEMESIS GO MASTER

CAE2406 Go Master **\$35.95**
CAE2405 Go Master Deluxe **\$112.30**
Requires 512K RAM; 800K floppy drive; System 6.0.2 or later.

The Funniest Talking Moose Since The One From Frostbite Falls!

REVIEWER'S NOTEBOOK: Relax, have fun, put a little Saturday-morning cartoon fun on your Mac with Talking Moose and his Cartoon Carnival! Jokes, one-liners and wisecracks spew from the mouths of the wackiest bunch of computer comedians ever assembled. Your host and emcee is Talking Moose, an animated entertainer that takes control of your Mac when you're not working and provides hilarious distraction. His group will even read your text documents aloud and speak your menu selections and window titles. The authors of this great new title, Baseline Publishing, certainly have a sense of humor, but they also offer up four other great Mac accessories that we'll review here — if we can stop laughing!

TALKING MOOSE. Moose humor is all the rage! Once your Mac goes idle, Talking Moose takes the stage with his band of crazy clowns, zany mice, wacky camels, riotous beavers and a host of other animated performers. They'll fire joke after joke at you (in either low-memory black and white or dazzling color) until you cry "uncle." Talking Moose not only gives your Mac a personality — it puts a chuckle in even the most pressure-filled days. Includes an INIT, a CDEV, desk accessories, HyperCard XCMD's, FKEYs and a hilarious written history of the Talking Moose Show. You can even write the jokes and have the Talking Moose loonies perform them! You select the time between Talking Moose shows along with speed adjustment, pitch, rate, pauses and more.

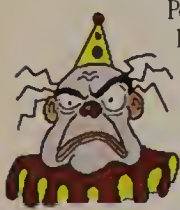
IT ALL STARTED SO INNOCENTLY. Scientists are at a loss to explain the exact origins of the Talking Moose. In fact, only in the past few years have some members of the scientific community come to accept the Talking Moose as a reality. The meager data collected so far (a few bone fragments and a photograph) seems to indicate that there were once huge herds of fun loving carnivorous moose-shaped dinosaurs that roamed the earth. Named TyrannaMoosus Rex ("Thunder Moose King") by an obscure Canadian paleontologist and part time ski instructor, these dinosaurs were responsible for many of the practical jokes that were played on unsuspecting herbivores in the Jurassic era.

The links between the ancient moose-lizard and the modern day Talking Moose are tentative at best. For instance, the fact that dinosaurs are lizards and mooses are mammals. Still, some over-educated archeologists suggest a practical joke with a meteor back fired on the thunder mooses, they foresaw the coming of the ice ages and disappeared into a large cave in New Jersey with a wake up call for the morning. If they did, then they have overslept.

THE TALKING MOOSE'S CARTOON CARNIVAL.

"The Greatest Show Possible Without Costly Trademark Infringements."

Bates the Mouse. Bates is a Northwestern sort of mouse, born into a prominent family of mice in the hotel and lodging industry. His father wanted Bates to become a lawyer, but Bates couldn't think of anything worse than making people's lives miserable for money. Bates joined the carnival in a fit of depression, immediately after being denied a spot on People magazine's most-eligible bachelors list.



Stinko the Evil Clown. Stinko was born Francis Brown in a sleepy little town in Iowa. He had a happy and fulfilling childhood, grew up and became a moderately successful storm door salesman. He was a member in good

standing with the local Elk's (gasp) Lodge, and all in all led a pretty humdrum life — that is, until the notorious "Birthday Clown Incident," an event that will live in infamy buried deep in the annals of Elk Lodge history.



Maj. Tom Beaver, Retired. Tom is one of the Talking Moose's oldest friends, since he was born in a river near the Moose's hometown. Tom had a peaceful life, which would have been enough for most beavers. Tom, however, know that he wanted more out of life than a split-level dam and a gourmet bark collection. Tom had always dreamed of reaching the stars, so with a few helpful prods from some familiar antlers, he began training.

ALSO AVAILABLE

Award-Winning

THUNDER 7

Total Word Mastery for your Mac.

Once you've collected yourself and stopped giggling, get back to work with the word mastery of Thunder 7. It's a spell checker FOR ALL OF YOUR APPLICATIONS! No more typos, punctuation or capitalization errors in your spreadsheet, database, page layout and communications applications — even desk accessories. Sure, you've got a spell checker in your word processor, but Thunder 7 avoids embarrassing errors

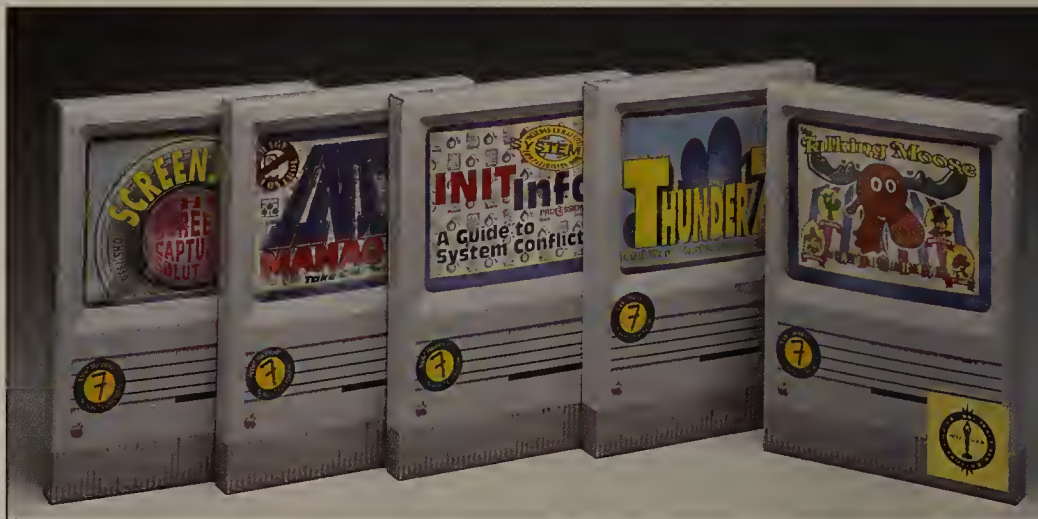
- User definable glossaries expand abbreviations and correct frequently misspelled words on the fly.
- New 1.4 million word thesaurus makes finding words a snap.
- Thesaurus contains definitions, antonyms, synonyms, contrasting and related words.
- Thunder 7 delivers broad compatibility with other Mac applications. Using external modules for reading and manipulating stylized text, Thunder 7 stays compatible with the latest applications.
- Thunder 7 works with any Mac from Plus or Classic to II x or II si running System 6.0.3 to 7.0 with 1Mb of memory. Hard disk strongly recommended.



SCREENSHOT. Clean, crisp screen captures made simple. All features are available from within one moveable window. Screenshot is a Control Panel Device, so you can set it up and capture the screens you need with almost any key combination. Anything that you can get on the screen is ready to capture with just a click (you can even capture portions of the screen if you like). Output to a printer or save a captured image in one of several graphic formats. Great for presentations, ads, brochures, training materials and hundreds of other uses.

INIT MANAGER. INIT Manager controls the startup process by gaining control and effectively managing INITs — infamous for conflicting with each other. It helps find the offending INIT and disables it — so you'll avoid repeated crashes. Specify which INITs load and in what order they're to execute (without changing filenames). C'mon, eliminate a little frustration in your life — with INIT Manager.

INIT INFO PRO. On-line, easy-to-understand advice on the use of Mac software, including programs running under System 7. Helps you avoid INIT incompatibilities, system conflicts and installation headaches. INIT Info Pro is the most complete list of INIT and application conflicts we've ever seen — and how you can quickly and easily resolve them.



TALKING MOOSE
was recently honored with a
prestigious "EDDY" Award for
BEST DESKTOP DIVERSION!

TALKING MOOSE

CAE2800 Talking Moose	\$22.00
CAE2801 Thunder 7	\$55.00
CAE2802 Screenshot	\$34.00
CAE2803 Init Manager	\$33.00
CAE2804 Init Info Pro	\$38.00

The 10-Ounce Hard Drive That Fits in Your Pocket!

REVIEWER'S NOTEBOOK: *We all knew that the time would come: the day when an 80-megabyte hard drive would fit in the palm of your hand. That day is here. But can a drive so small compete with the performance and reliability of those mammoth drives that you're used to? You bet. In fact, The HitchHiker is a true high-performance data storage device, superbly crafted and shock-mounted in a compact, rugged housing that measures 5.4" by 2.9" by 1.1" — it actually fits in a dress shirt pocket! Absolutely priceless for PowerBook users, available in 40 and 80 megabyte capacities. This amazing new instrument has serious implications for Mac and Powerbook users on the go. Throw the HitchHiker in your briefcase and you've got everything you need. Pick up a HitchHiker and take your data with you!*

We'll also take a look at HitchHiker's bigger brothers — the DiamondDrive Portables. These high-capacity hard drives are available in sizes from 89 megabytes up to 510 megabytes and install in just a few seconds — just plug it into a SCSI. The DiamondDrive Portables weigh less than 3 pounds! They provide outstanding performance, proven reliability and excellent value.

The implications of this tiny, well-built hard drive are enormous! Moving data around, taking it home, keeping it safe and creating the "ultimate backup."

Itsy-Bitsy Size, Towering Performance.

The HitchHiker is a masterpiece of miniaturization. But don't be fooled by the small size. It's been designed and engineered with state-of-the-art technology and it's built like a tank — so it can handle the rigors of travel. Featuring the latest 2.5-inch drive technology with advanced rotary voice coil design, this little brute is highly shock resistant (our first test was to drop the HitchHiker off of a desk onto a tile floor — we then plugged it in and found absolutely NO data damage!). It also features extremely low power consumption and swift access times: averaging 16 milliseconds for the 80 megabyte drive and 25 milliseconds for the 40 megabyte drive! There's a built-in 32K data buffer and 1:1 interleave for uncompromised data throughput. You won't find this level of performance in many other "brand name" Mac hard drives.

Flexible, Portable — Desirable. Plug the HitchHiker into any Mac (PowerBook users can use the optional HDI SCSI cable and special edition Powerbook drives). A standard 25-pin SCSI connector allows instant hookup to your Mac's SCSI port — and the HitchHiker is powered directly from your Mac.

Some innovative businesspeople are carrying

their hard drives around — without computers! I can take all my files home with me and work on my Mac at night — then just give The HitchHiker a ride to work in the morning. When we get to work, I just plug The HitchHiker into my Mac at the office and pick up where I left off before I quit to watch David Letterman. Sensitive files can be put on The HitchHiker and taken off-premises for safe keeping. I can also create "The Ultimate Backup" by copying data to my HitchHiker — it's fast, easy — and I can take it with me! I can't imagine any backup concept that could be easier or more convenient...

Back At The Ranch... Innovative thinking and quality data storage products are Mass Microsystems' hallmark. From the tiny HitchHiker we jump to a family of high-capacity portable hard drives for the heavy (and homebound) Mac user. The DiamondDrive Portable family features capacities from the classic 80 megabytes to a whopping 510 megabytes, each with astonishing specs and a heritage of rock-solid reliability. And make no mistake, reliability is what it's all about. The DiamondDrive Portables topped the industry's list of drives with an incredible 150,000 MTBF (Mean Time Between Failure) rating. That's a direct indication of an instrument's reliability. They feature auto-parking heads to insure safe transportation of data and a 70G shock rating for data survival in any condition.

The DiamondDrive Portables are great for taking your data home — and taking it on the road. Large graphics and desktop publishing files can be transferred to type-setters and other output devices faster than waiting for them to crawl along Ethernet. Great application...

The DiamondDrive Portable we tested displayed superior performance, too. In fact, the DiamondDrive Portable 320 megabyte drive sliced through our data transfer tasks at an amazing 5-6 megabyte per second rate to buffer, and an impressive 2 megabyte per second transfer rate to disk! Average access times were



clocked at 12 milliseconds with 1:1 interleave. These speedsters processed data unlike anything we've ever seen! Now you can actually have 500 megabytes of storage space with you at all times! Don't worry — DiamondDrive Portables are built to travel, featuring a mar-resistant housing and fully shock-mounted media. Depending on capacity, you can choose either the low-profile, 1-inch portable with single SCSI port, or the 2-inch portable with dual SCSIs. The 1-inch is available in 80Mb or 120Mb capacity while the more versatile 2-inch has a greater selection of drives — 80-510Mb! Both models are very compact — they fit in your briefcase!

These DiamondDrive Portables contain no internal power supply, a secret to their lightweight portability. It is powered either by a small external power pack or through a special cable that draws power from the Macintosh through the floppy disk port.

Includes PadLok HD Utility Software. Work smarter and use your DiamondDrive Portable to its maximum performance with a complete set of software utilities. Quickly format your disk and add tough security features. Easily manage the largest mountain of data — you can partition your disk into multiple volumes and improve access times dramatically by reading smaller portions of the disk. The Test Diagnostic feature is designed to analyze the disk and report on any bad blocks — before the data is written. The Cursor Sensitive Help gives you a description of each menu selection on the Macintosh desktop. All in one sleek, 3-pound case.

All DiamondDrive Portables come with a solid 2-year warranty from the manufacturer, Mass Microsystems, Inc. The HitchHiker contains a patented design that protects your data with full shock-mounted construction. Turn to the proven reliability of Mass Microsystems' DiamondDrive series.

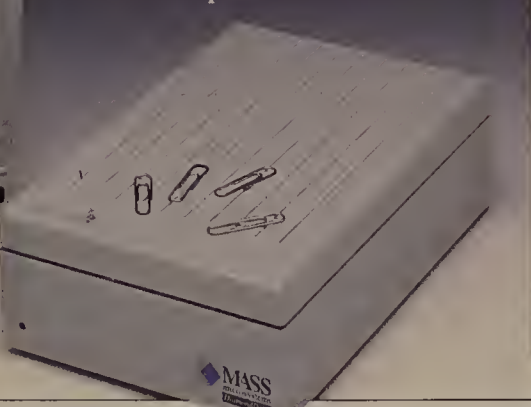
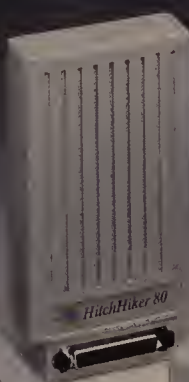


The HitchHiker ▶

The tiny, 80 Mb Hard drive.
Take your data with you!
Weighs just 10 oz. Also
available in 40 Mb capacity.

The DiamondDrive Portables

In sizes from 80 Mb up to 500 Mb.
One-inch drives with 80 Mb and
120 Mb capacities; two-inch drives
for 80 Mb up to 510 Mb. ▼



HITCHHIKER HARD DRIVE

CAE2817	HitchHiker 40 Mb	\$510.00
CAE2818	HitchHiker 80 Mb	\$690.00
CAE2819A	DiamondDrive Portable 80 Mb ...	\$442.00
CAE2819B	DiamondDrive Portable 120 Mb ...	\$550.00
CAE2819C	DiamondDrive Portable 210 Mb ...	\$945.00
CAE2819D	DiamondDrive Portable 320 Mb ..	\$1499.00
CAE2819E	DiamondDrive Portable 510 Mb ..	\$1899.00

Call for PowerBook Drive Prices and
details on other DiamondDrive Portable
models and capacities.

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Best-Selling CD titles For Business, Information, News And Packed With High-Quality Art!

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CLIP ART MASTERPIECES: A classic disc. Contains over 1300 magnificent turn-of-the-century engraved and woodcut images. Available in 300 dpi TIFF and PICT formats. The powerful image index finds any specific topic in seconds! Includes Animals, body parts, characters, faces, couples, events, foods, plants, kids, publishing tools, sports, transportation and hundreds more!

Down To Earth! Subtitled "Close Ups Of Our Natural Environment," this disc contains over 750 original resolution color and black and white images in PICT, TIFF and EPS formats. Includes color video-digitized images and color drawings. Fascinating shots of trees, landforms and more.

Quick Art Lite. Over 1500 pro-quality images on a single CD. Each 300 dpi and available in TIFF format. Includes animals, borders, food, holidays, mail, maps, money, science, office, travel, sports, hundreds more.

Quick Art Deluxe. Look out! Here comes a truckload of professionally drawn, top-quality images! Over 3000 in all, with 300 dpi crispness and available in TIFF format. Great desktop publishing companion — the only art library you'll ever need, on one CD-ROM! Includes a paper catalog to identify images. You get (in addition to topics listed above in Quick Art Lite) birds, buildings, education, fish, gardening, medicine, music, mystery, weather and thousands more! One of our CD-ROM Hall of Fame discs.

EPS Professional Vol. 1. The definitive collection of CD-ROM graphic design. Includes an incredible 900 fully resizable, Encapsulated PostScript images. From the graphic design studios of Christopher Marshall Designs (CMD) and LasArt, EPS Professional contains design elements for T-shirts, alphabetic designs, four-color pieces, covers and backgrounds. Supports PostScript laser printers, imagesetters and other high-end output devices. If you're a designer, this disc will save you time

and make you money!

GAIA/Environmental Resources. The ultimate database for environmentally conscious Mac users. Contains an incredible collection of wildlife photos and environmentally sensitive scenes, one of the finest portfolios we've ever seen. Over 400 images in all, with 24-bit color, in PICT and TIFF formats. Also includes databases of environmental organizations and ecology-oriented publications.

PhotoBANK Volume 1. Don't hire a photographer — use PhotoBANK original images! PhotoBANK is brimming with over 500 Mb of high-resolution color photos. These photos have never been published before. Each photo is available in 3 formats: 24-bit PICT (1285×886 pixels), 24-bit PICT (640×480 pixels) and 8-bit PICT (640×480 pixels). Topics include nature, patterns, flags, background, hotels, statues, animals, girls, traffic, finance, buildings, the beach, the city — many more.

Sound Library 2000. Over 2000 digitally recorded sounds to use on your Mac! Great for desktop presentations, background effects and your own radio commercials! Sounds include animals, household sounds, musical instruments, nature, planes, cars, beeps, people and dozens of digital special effects. Browse, listen or duplicate sounds.

Space Time & Art. 300 fascinating 24-bit color images on the subject of space. Great disc — hours of exploring is in store for you — see NASA views of space and photos from Voyager missions along with a collection of astonishing original oil paintings by noted space fantasy artists.

Trade Opportunities: International And Domestic. The vast market "over there" is opening up. This priceless title includes information from the Department of Commerce "Trade Opportunities Program, Commerce Business Daily, External Affairs and International Trade Canada 1991 Companies for World Markets and a complete section on selling to international markets. Where do you fit in to the global economy?

Wayzata World Fact Book 1991. The world almanac of the Federal government, based on the CIA World Fact Book produced annually by the CIA. Covers territories, countries, protectorates and disputed land claims worldwide. All kinds of information is included: socioeconomic, geo-political, demographics and more. Includes data from the Bureau of Census, Defense Intelligence Agency, Defense Nuclear Agency, De-

partment of State, Department of Interior and US Coast Guard. **NEW! BBS In A Box Vol. IV.** The ultimate CD-ROM for the Mac enthusiast. From the popular Arizona Mac Users Group comes over 8,000 files and 500 megabytes of compressed Mac Software! Decompressed, that's over 1.1 gigabytes of great stuff! You get art, games, business applications and utilities, films, newsletter articles, HyperCard, music, fonts, Mac technical notes, telecommunications and much more.

Front Page News Series. Includes full text of the nation's most talented journalists working for 15 of the world's wire services. Over 225,000 news articles in all! You'll have instant access to 3149 environmental articles, 2,222 Gulf War articles, 1487 AIDS articles, 924 abortion articles — thousands more!

CD-ROM COLLECTION

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CAE9304 EPS Professional Vol. 1	\$239.20
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CAE9306 PhotoBank Vol. 1	\$148.00
CAE9307 Sound Library 2000	\$103.20
CAE9308 Space Time & Art	\$159.20
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CAE9320 Best of MacTutor Vol. 1-6-Source Code	\$103.20
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CAE9322 GEM Macintosh (Public Domain)	\$95.20
CAE9323 BBS in a Box (from Arizona Mac Users Group Vol IV)	\$95.20

Additional titles added continuously. Call for updated list.

The Ultimate Audio System For Your Mac! High-Fidelity, Digital Audio For MultiMedia, Games And More!

REVIEWER'S NOTEBOOK: Apple makes great computers, but they're not in the speaker business. That tiny internal speaker is fine for beeps and gongs, but for high-quality audio, especially for dramatic presentations, it falls a little short. Now the audio specialists from Persona Technologies have devised a powerful speaker system, capable of reproducing the full range of digital sounds. MacSpeakers are incredible. You'll hear clean, rich sound and have complete control of volume, bass and image to enhance definition of the sound from your CD-ROM, Laser-disc and MacRecorder.

These fine speakers use a unique Sonic Imaging Control technology, that creates stereo voices, music and effects — even if your Mac originates a mono signal! Add the magic of brilliant sound to your presentations. Simple to install, they slide right onto the side of your Mac. Turn them on and — boom! — you're pumping out studio-quality sound. Great for Mac composers and musicians, Multimedia, CD-ROM, Game freaks, Mac-based voice application users, studio pros and presentation innovators.

Shatter The Sound Barrier!

Pure, realistic sound. High-fidelity audio comes to the Mac with MacSpeakers — fully powered and packed with sub-woofer whallop! Handles any sound reproduction task and grabs an audience by its ears! Even at lower volumes you get rich digital sound—but crank it up and hold on...

The controls on each MacSpeaker allows you to control the volume and bass. A small headphone jack in the back of the speaker allows you to bypass the external speakers and listen to golden tones on your MacHeadphones.

The Zero-Footprint Speakers! MacSpeakers take up no desk space, mounting in minutes to the sides of any Mac monitor — from the SE to the two-page graphics monitors. Dual Lock, the unique mounting



system allows perfect placement and positioning of MacSpeakers for maximum clarity and sound impact. And don't worry — MacSpeakers are magnetically compensated to protect your monitor from the danger of magnetic fields, which could degrade your picture. There's something to think about when you buy speakers...

Installation is a snap. Just plug your MacSpeakers into your mac's sound output jack with the cable supplied in the box. MacSpeaker can also be used with other audio equipment such as synthesizers, CD players, Laserdiscs and VCRs. The speakers are powered by a standard, 18 volt, 1 amp desktop power supply which is included. The advanced speaker equalization contour control provides natural balanced sound.

MACSPEAKERS

CAE2855 MacSpeakers	\$170.00
CAE2856 MacSpeaker Tripod Set	\$29.95
CAE2857 MacSpeaker Standard Stereo Mini to 2 RCA Y-Adapter Cable	\$19.95
CAE2858 MacSpeaker Standard Stereo Mini Extension Cable	\$9.95
CAE2859 Carrying Case	\$24.95



Pump Out Maximum Speed!

With The Proven Performance of DayStar Acceleration Products...

REVIEWER'S NOTEBOOK: Mac users are screaming for more speed! Applications demand faster processing and the world will not wait. The answer is on this page: DayStar's incredible line of speed demons. Three products are reviewed here, the Universal PowerCache, The RAM PowerCard and the sizzling 64K FastCache IIci. They are magnificent, with the ability to transform your computer instantly. The Universal PowerCache (available in 33MHz, 40MHz and 50MHz speeds) accelerates everything up to 300%, with 100 percent compatibility with all hardware and software. The RAM PowerCard delivers up to a whopping 256 megabytes of very fast RAM per NuBus card. It flies! With the FastCache, IIci, IIsi and Quadra users will be weak in the knees with 45% increased speed for word processors, graphics, database and spreadsheet applications.

Universal PowerCache. Combine the blistering speed of a high speed processor (33-, 40-, or 50MHz) with an incredibly fast RAM cache and you've got the industry's most respected time saving enhancement. The award-winning PowerCache accelerates every function (up to THREE times faster) in all appli-

cations — including graphics, desktop publishing and spreadsheets. It's the proven 030 performance that beat out all 040 alternatives. And keep in mind, it's guaranteed 100% compatible with all your software and hardware. Can any other board make that claim? One card fits seven different Macs (adapter required for non-IIci machines). Let's take a closer look: The 33MHz PowerCache offers near-IIcx performance, while the 40MHz delivers full-IIcx class speed. But hold on — the 50MHz monster sends your Mac to the limit with near-Quadra speeds! We tested the hot 50MHz board with Adobe Photoshop, Aldus Freehand, Infini-D and Quark Xpress with results ranging from 225% faster to over 330% faster! Simple to install, just plug it in and hold onto something!

NEW! The RAM PowerCard. Fast RAM on a NuBus card. The ideal way to accelerate Adobe Photoshop. RAM drives speed up many functions 200-300% when working with files of 300 dpi or higher. Also non-volatile with Photoshop. Just pop in up to 16 standard 1, 4, or 16 MB SIMMs per card and drop in a NuBus slot. Lowest cost an easiest installation for 64 MB upgrade. Automatically combine multiple cards. It's easy! Now includes PowerStart auto-load software.

A unique design allows you to gang multiple RAM PowerCards to form one super-quick RAM disk — or act as separate drives. You can pre-

load "scratch files" on the RAM PowerCard, eliminating any hard disk wait — try it and you'll be amazed at the increase in imaging application speeds. And here's a killer: with the RAM PowerCard, your System 7 virtual memory file can reside in virtual RAM! The result is instantaneous switching between applications and the ability to give memory hungry programs the memory they need.

NEW! 64K FastCache for IIci, IIsi & Quadra 700 & 900. An ideal, economical cache for all applications. By temporarily storing up to 64K of recently used data, the superfast static RAM on the FastCache enables the Mac's processor to run at near zero-wait states! Translation: the PowerCache is unstoppable. And unlike competitors, The PowerCache is 100% compatible and includes PowerMath software that can speed up calculations by up to 400%! How much faster will your IIsi or IIci run? Our testing produced these results: a typical search and replace in a Microsoft Word document was 150% faster; creating a duplicate in Aldus Freehand was 130% faster; recalculating an Excel spreadsheet was 140% faster. Quadra gains of up to 40%, depending on the application.

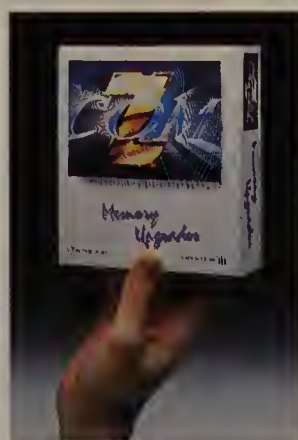


Quality Memory — at Just a Fraction of the Price You'd Pay for Apple Memory!

REVIEWER'S NOTEBOOK: Here at Tiger we love our Mac LC and II computers, but we kept getting "The application could not be opened" and "Application has unexpectedly quit" messages. We found out that the amount of memory they came with from Apple just wasn't enough for the newer applications. So we called Apple and priced out more memory. Wow! We were in shock! \$995 for 4MB of memory! We knew something wasn't right. So we set out to find a better way.

Who Needs It? Desktop publishing, high-end graphics, animation, CAD, modeling, and a multitude of other applications demand more memory. Quark cries for at least 8MB (MegaBytes). PhotoShop wants to put up "Out of Business" signs unless it gets 4MB. System 7 demands 2MB all for itself, then you must have some more for your applications. And if those applications don't get what they want, they can be pretty tough characters to work with.

When you try to run an application but doesn't have enough memory, two problems may occur. If you are really short on memory, the application may simply refuse to launch. The Mac will display a dialog box that says "The application could not be opened." Worse, it may let you open the document but later quit in the middle of the session displaying "Application has unexpectedly quit." Usually you get a warning before you launch telling how much RAM you ought to have versus how much is actually available. If the amount is 75% of the total normally required, you are probably risking an "Unexpected Quit." All of your recent changes since the last Save



will be lost. Ever notice the colors reverse on your screen? That's the way some applications warn you of low memory.

PowerBook Shortages! The new PowerBook revolution has really taken off. Everybody wants one of these fantastic portable Macs. And as soon as they get one... they want more RAM, which has made the availability pretty scarce. The PowerBook needs a physically different (smaller) size than the other Macs. And if you've tried to get some, you know that although it's advertised all over, getting it delivered to your door is another story. The supply is incredibly short. But you're in luck! Since you're reading Tiger, you know practically the only source for this new PowerBook RAM. Tiger has it!

Printers Need Memory Too... LaserWriters use memory to store fonts and prepare graphics for imaging. Ever been stopped from printing a page with several different fonts or perhaps a large graphic image? ...then you need more memory. Adding memory to a LaserWriter increases the space so you can print with more fonts, bigger graphics, and speed up overall printing in many cases.

FREE BOOK & DISKETTE!

What is memory and why do you want more of it? Order now and get "The Macintosh Memory Guide" from Connectix absolutely free. A simple explanation of memory and how to get the most out of your Macintosh. Packed with tips on making your Mac faster; best explanation of 32-bit addressing mysteries. Includes HyperCard stack on diskette for easy reference. A complete memory guide — FREE! Picks up where your Apple Users Guide left off...

For example: Did you know that RAM is actually a place to temporarily store your data and applications? It's temporary because when you turn off the power, it's gone. Your hard drive or diskette is where you permanently store your files. That's what happens when you "Save" your file. The file is transferred from RAM to the hard drive or diskette.



Z-COM

CAE2835 1MB for SE30, II, IIx, IIcx, IIsi	\$59.00
CAE2836 2MB for Plus, SE, LC	\$95.00
CAE2837 4MB for IIci, IIsi	\$185.00
CAE2838 16MB for IIci, IIsi, IIx, IIcx	\$655.00
CAE2839 4MB for IIcx	\$180.00
CAE2840 16MB for IIcx	\$655.00
CAE2841 4MB for LC	\$180.00
CAE2842 8MB for LC	\$339.00
CAE2843 2MB for PowerBook 100, 140, 170	\$195.00
CAE2844 4MB for PowerBook 140, 170	\$395.00
CAE2845 6MB for PowerBook 140, 170	\$519.00
CAE2846 1MB x 8 SIMM Modules 80 ns	\$42.00
CAE2847 2MB x 8 SIMM Modules 80 ns	\$79.00
CAE2848 4MB x 8 SIMM Modules 80 ns	\$145.00

SIMM Modules have a 5-year warranty; all other memory has lifetime warranty. 60ns, 80ns and 100ns RAM also available.

Create Powerfully VISUAL Desktop Presentations!

Nothing Grabs An Audience Like CA-Cricket Presents

REVIEWER'S NOTEBOOK: *CA-Cricket Presents and CA-Cricket Graph are two of the easiest graphics packages in the industry today. CA-Cricket Presents combines all the necessary tools you'll ever need to develop, organize and deliver a professional presentation to peers, superiors, prospects, corporate management or the financial community. If time is tight — when isn't time a consideration? — CA-Cricket Presents is the only package you could use — it's fast and simple, designed so well that you follow logical steps to a great presentation. The Acta Outline Processor helps you quickly organize information, ideas and major points. A complete set of templates and palettes help you add sizzle and splash — and choose from dozens of professionally designed backgrounds, borders, frames, color combinations, layouts and graph types and tables. You can add your company name, or any other custom element in seconds for great presentations.*

Great use of Mac power and grace, great presentation management tools.

CA-Cricket Graph, also reviewed here, is the perfect tool for serious graphing tasks. Professional power, yet sleek and simple to use. Very flexible, allows 12 different graph types. A great companion product to CA-Cricket Presents.

CA-Cricket Presents... (A hush falls over the crowd.)

Whether you've been asked to prepare a killer presentation with an impossible deadline, or you've got the luxury of a little time, CA-Cricket Presents is the package you should reach for. It's extremely visual, with tools designed specifically to speed the design process. Because pictures are better than words, great pictures are best — providing maximum impact and clear communication. Create 35mm slides, dazzling overheads, speaker's notes and pro-quality handout materials. The graphic design is built-in: a collection of magnificent templates that are ready to use, or can be altered to meet your specific needs...in seconds. CA-Cricket Presents also knows how successful presentations should be assembled, providing great outlining tools to focus your efforts. The Acta Outliner, mentioned earlier, is an innovation in presentation software, helping you formulate and organize your ideas. Along with the Templates and Palette tools, there's a feature that AUTOMATICALLY assembles your presentation for you! It's called Auto Presents. Just enter your text in the Outliner, select a template and your ideas instantly become a full-blown presentation!

Advanced users will love the comprehensive set of tools available to them. Unmatched text manipulation tools, drawing features, sophisticated graphing and table capabilities. The CA-Cricket Presents file integration allows you to work with images and other graphics from PICT, PICT2, MacPaint and EPSF formats. Import text from your word processor, or any information you need quickly from your database or spreadsheet, using SYLK files.

Then there's CA-Cricket Presents' masterful Presentation Management. An array of easy-to-use tools that keep your presentation organized and running smoothly when you're in front of the audience. The "Electronic Light Table" allows you to quickly arrange and re-sequence your individual frames as if they were spread out on a light table. Fascinating feature, very convenient. Sort by title or image — even allows you to incorporate frames from other presentations for tremendous time savings during rehearsal

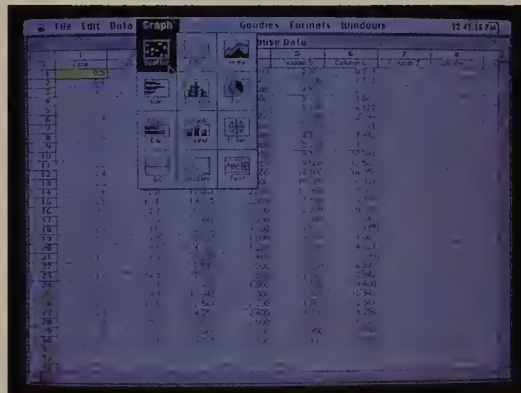
and editing. Last-minute changes or re-thinks are no problem.

The "Speaker's Notes" feature allows you to build a frame-by-frame script for your presentation. A tight, well-written script is critical to a successful, communicative presentation. CA Cricket Presents lets you add notes directly or paste them in for automatic placement on each frame. You can't get lost, so you can be confident as the curtain goes up on your presentation. "Video Presents" is your rehearsal director, advancing frames as you speak, great for fine tuning your timing. CA Cricket Presents not only helps you create a great presentation — it helps you deliver it.

Present Information Like A Pro... Professional sales people, fund raisers, financial consultants and marketers prepare a variety of materials. Slides, handouts and notes are useful in keeping an audience glued as you speak. You can produce high-resolution, professional quality black and white and color output from a wide range of film recorders, image setters, ink jet, thermal and laser printers. CA-Cricket Presents also includes a driver for the Autographix Overnight Slide Service. Or you can use Video Presents to run your presentation on-screen with special effects, transitions and variable timed automatic frame advance. CA-Cricket Presents runs on The Mac Plus, Mac SE and the entire family of Mac IIs with speed and grace.

CA-Cricket Graph... Professional Graphs In Just Seconds!

CA-Cricket Graph is the standard in Macintosh charting. You won't find the depth or sleek operation of CA-Cricket Graph anywhere else. Just enter your data into the program itself or import it directly from your word processor, database or spreadsheet and select one of 12 chart types. Includes Scatter, Quality Control, Stacked Bar, Pie, Double Y, Polar, Column, Line, Area, Stacked Column, Bar and Text charts. Great for business, engineering, statistical and scientific users. Change a number — or even chart type — then just click the "New Plot" command and your chart is instantly drawn. Unlike other charting products, CA-Cricket Graph gives you total control of every graph element. Customize your graphs with fast, easy data importing in text, SYLK, JWKS and WKS formats. Format your data window any way



you like, enter up to 100 columns and 2700 rows of data. Select from 16 bar patterns, 48 plot symbols, 6 line styles and 5 line widths. Choose your fonts, type styles and sizes. Place lines, text, arrows, rectangles ovals and other elements anywhere you want. Position your graphs wherever you like and even stretch or shrink them to fit any layout. Overlay multiple sets of data and add colors to your backgrounds and objects with just a mouse click.

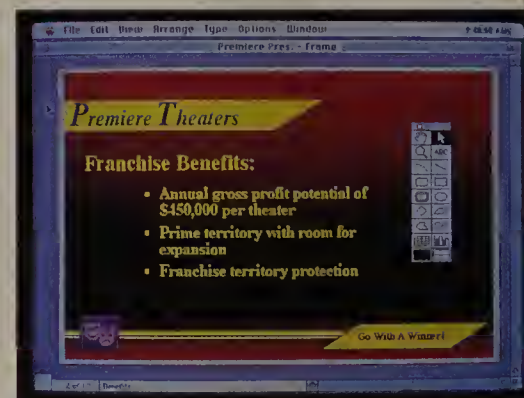


You'll quickly manage and display data in a range and format that is instantly graphed, including decimal, alphabetic, scientific, percentage, and currency formats. Output top-quality graphs, including multiple graphs per page.

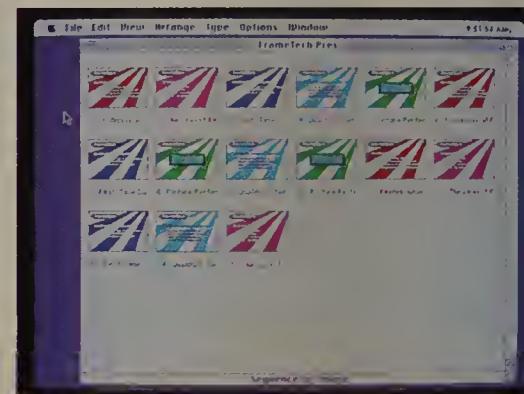
The ability to export graphs in PICT format makes CA-Cricket Graph an excellent tool for use with desktop publishing and desktop presentation applications. Graphs can also be printed on your LaserWriter, ImageWriter II or any chooser selectable device.



Create dazzling intro screens and transitional slides. Instant backgrounds, graphics and more!



CA-Cricket Presents gives you pro-quality text.



Slide sorter makes arranging presentations easy. View every frame on an "Electronic Light Table".

CA-CRICKET PRESENTS

CAE2806 CA-Cricket Presents \$139.00
CAE2807 CA-Cricket Graph \$89.00

The Mac Is A Perfect Fax Machine!

REVIEWER'S NOTEBOOK: Turn your Mac into a full-featured, lightning fast fax machine. DoveFax and DoveFax+ each provide 9600-baud fax-modem features and 2400-baud data modem capabilities. You receive faxes without interruption and a handy re-dial feature makes sure your fax gets sent. Fully Group III compatible, The Dove Fax delivers the highest quality facsimile reproduction of any product we tested. Installs in 5 minutes. Tested 100% Hayes compatible. Communicate reliably with over 2 million fax machines around the world. Your Mac is a perfect fax machine — create your documents and fax them instantly — and take advantage of the features engineered into each DoveFax — and the power of your computer.

DoveFax is your connection to other computers, databases services, banks, bulletin boards and more. DoveFax+ includes an easy-to-use, sophisticated voice messaging system — never miss another call! DoveFax devices are very competitively priced, loaded with value — hundreds less than buying a modem, fax machine and answering/messaging machine separately.

DoveFax. Great-Looking Faxes, Automatically.

DoveFax allows you to use the power of your Mac to create handsome cover sheets with great looking type and graphics. Dove Fax supports multiple phone books, distribution lists, call grouping and the ability to fax documents to multiple locations. The QuickFax desk accessory allows you to whip off faxes whenever you need to, without waiting. There's an on-line fax directory, on-screen display of faxed documents and fax preview feature that lets you see precisely what your faxed document will look like before you send it. But perhaps the most impressive feature is the intuitive DoveFax software interface that makes it all possible — and makes it all simple. Schedule and send faxes whenever you choose — even when you're not around — to avoid high-priced phone rates. When a fax comes in, it's automatically logged and you can even convert faxed documents to PICT, TIFF and leading paint formats.

Some Very Handy Faxing Utilities... DoveFax includes software that really cranks up your Mac's abil-

ity to handle faxes. The FaxManager is a built-in application that controls your fax activities. It is responsible for sending and receiving faxes, view and print received faxes. It also allows you to manage and use your fax phone books. FaxPrint is the advanced printer driver for the DoveFax modem. FaxPrint is quickly installed in your system folder allowing faxes to "print" from within an application. FaxMenu is a startup application (INIT) that allows you to fax documents directly from within an application.

DoveFax includes the most extensive set of built-in and communications software we've ever seen. These utilities make a big difference in ease-of-use and productivity. And every DoveFax is tested individually for any defects. Dove has one of the highest customer satisfaction ratings in the category. Compatibility is not problem — DoveFax and DoveFax+ meet all appropriate FCC, EAI and CCITT telephone standards, along with many international standards.

How The Dove Fax Works... Basically, if you can print a document, you can fax it. That's the beauty of using your Mac as a fax machine. You create beautiful pages on your word processor or desktop publisher — and DoveFax takes care of getting it to its destination. The FaxPrint file that resides in your system folder is actually a printer driver just like your Laserwriter and Imagewriter drivers. FaxPrint (included with Dove Fax) creates an image of your document, but instead of sending along to a printer, it spools it to the FaxSpool folder in your system folder. From there the file is sent through the DoveFax modem and over the phone line. That's all there is to it.

In addition to being able to send faxes in the background, while you continue to work, you can receive faxes in the background as well. DoveFax can be quickly set up to automatically answer your phone and receive faxes while you work. The modem answers the phone after a certain number of rings (you decide in the Chooser) and makes the connection. The incoming faxes are logged in, checked for completeness, dated and stored on your hard disk. You can call them up on your screen or print hard copies. Multiple page faxes are viewed by just "flipping pages." It's fast and easy — and a lot more convenient than waiting at the fax machine.

The Dove Fax modem is also an easy to use,



2400-baud Hayes compatible data modem that allows fast, reliable connection to other Macs, computers and on-line services. We've discussed the advantages of a fax/modem, but a highly reliable, super fast data modem is a must for your Mac, too. DoveFax provides blistering 2400-baud transmission, great for PowerBook users on the road. Its small footprint (or "palmprint") and ultra light weight makes it a perfect traveling companion.

DoveFax+. DoveFax+ contains voice modem features that opens the door to another level of convenience and productivity. Now your Mac will answer the phone for you, play back personalized recordings to callers, record incoming messages, forward messages to another phone and much more.

The Personal Telephone Manager For Your Mac!

We love the idea of making the Mac a personal communications center. It makes sense and proves amazingly useful and convenient. Let your Mac answer the phone with a message that you quickly create (you can even throw in some nifty special effects). In fact, you can configure the program to answer with specific recordings for each day, a few days during a trip, different times of day, or any combination. Or, for specific messages to only select people, you can issue caller ID numbers to associates and leave them custom, confidential messages. Incoming fax? Instantly switch from voice and fax mode to fax mode to receive and send faxes.

There's more! Like the ability to forward messages to another phone, screen your calls on Macs equipped with an Apple Sound Chip and even import SoundEdit, AIFF and Snd sound files.

Also From Dove... MaraThon Boards: Low-Cost, High-Output Accelerators.

The same dedication to quality and value is brilliantly displayed in the MaraThon 68030 Racer Accelerator Boards, featuring on-board 16MHz and 32Mhz Motorola chips. Greater speed, enhanced performance at an affordable price. Your productivity will skyrocket — everything moves faster, draws faster, calculates faster. Each product is designed to provide speed improvement for any expertise level — and any budget. Call a Tiger Macintosh specialist for complete details on these incredible accelerators.



DOVEFAX

CAE2812	DoveFax/LAN	\$495.00
CAE2813	DoveFax+	\$355.00
CAE2814	DoveFax Desktop	\$265.00
CAE2815A	MaraThon 030 SE	\$365.00
CAE2815B	MaraThon 030 II	\$695.00
CAE2815C	MaraThon 030 Plus	\$365.00

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"THE BEST UPGRADE VALUE WE'VE SEEN YET FOR THE SE."

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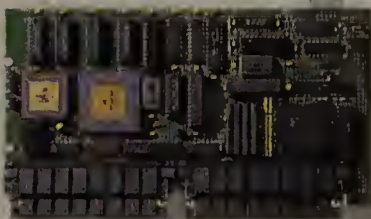
Upgrade to Mac IIci performance
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System. The only
complete 030
accelerator and
display system
available for the SE
and Classic for one
low package price.

TOP-RATED IMAGE QUALITY.

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most visually appealing..." wrote
MacWorld, "...very bright, very
sharp, very easy on the eyes."



SE W/MOBIUS 030

MAC IIci

MAC IIxi

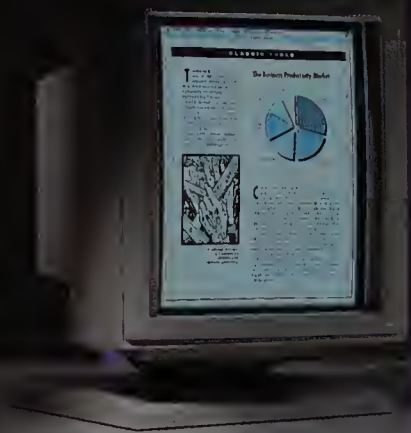
SE

Performance Comparison

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With a 25 MHz 030 accelerator and video on one
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\$1295
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W/25 MHZ 030



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fax 510-523-8452. Pricing subject to change without notice.

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MACWORLD

THIS MONTH:

Outbound's Faster
Notebooks • Statistics
Mess • Compute
Servers Share Work
• 040 Accelerators

BY DAN LITTMAN AND TOM MORAN



THE OUTBOUND NOTEBOOK SYSTEM 2030 HAS TWO MODELS: ONE WITH A 25MHZ 68030, THE OTHER WITH A 33MHZ 68030.

Fast Notebook Macs from Outbound

Outbound Systems has begun shipping the Outbound Notebook System 2030E and the Outbound Notebook System 2030S. The 2030E has a 25MHz 68030 microprocessor, while the 2030S boasts an even speedier 33MHz 68030. Both hold up to 14MB of RAM; offer a 40MB, 80MB, or 120MB internal hard drive; and include a SuperDrive-equivalent floppy disk drive and a socket for a math coprocessor chip. Each notebook weighs about 6¼ pounds including drives and battery.

The basic configuration of the 2030E with 4MB of RAM and a 40MB hard drive lists for \$3299. The basic 2030S with the same RAM and drive is

\$3899 retail. The 2030E is shipping now, and the 2030S is expected to ship in the first week of March. Outbound, 303/786-9200.—T.M.

Money Markets

Meca Software plans to market a line of forms that will work with version 5 of the company's Andrew Tobias' Managing Your Money (MYM). Meanwhile, version 5 of MYM can print checks including Meca's

own and Intuit's Quicken checks. MYM version 5 has password-protection; can automatically reinvest dividends; lets users define the sort order when reconciling checking accounts (for example, by date or check number); and has a review window that shows all the transactions performed during a session. Pricing was not set at press time, but it will probably be less than the previous version's \$179.95. Meca, 203/256-5000.—D.L.

TREND

RasterOps Unveils 16-Inch Monitor

Adding weight to the movement toward 16-inch monitors, RasterOps Corporation has introduced the Sweet Sixteen System, a low-cost combination of a 16-inch display and a 24-bit graphics adapter board. Available now, the \$2495 display system comes in versions for the Quadras and the Mac II series.

The company has also introduced the ImagePro, a RISC-based accelerator for computation-intensive applications. The \$999 ImagePro can also be used for JPEG compression, and it supports QuickTime. It was slated to ship in February.

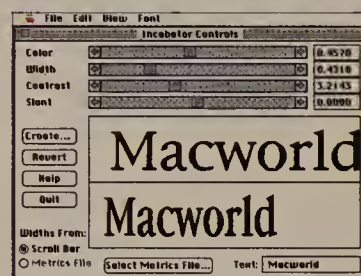
Also available from RasterOps is the \$1999 VideoTime, a NuBus board that displays a 16-bit full-motion video window on screen. Users can install more than one VideoTime to independently show and control several live TV channels at once, for instance. RasterOps, 408/562-4200.—T.M.



THE RASTEROPS SWEET SIXTEEN SYSTEM COMBINES A 16-INCH MONITOR WITH A 24-BIT GRAPHICS ADAPTER BOARD.

Home-Brewed Fonts

A new company that was founded by a former member of the TrueType team at Apple has developed a software program for modifying TrueType fonts.



ADJUSTING THE WIDTH OF A TRUETYPE FONT WITH THE INCUBATOR. THE INCUBATOR CAN APPLY CHANGES AUTOMATICALLY TO AN ENTIRE FONT.

With The Incubator, anyone can modify a TrueType font's color—that is, its darkness or weight—its width, the contrast between its thick and thin strokes, and its italicization. The Incubator can modify fonts globally without requiring hand-tweaking of every character. The metrics of a modified font can be saved in a file, and someone who receives a document with an Incubator-modified font can use the metrics file to reproduce a font that matches the document. The Incubator lists for \$149. Type Solutions, 603/382-6400.—D.L.

Imagine getting twice the Bernoulli for two-thirds the price.

The new Bernoulli 90MB.



Welcome to the next generation of removable storage, the new Bernoulli® 90 from Iomega®.

At 90 megabytes per removable disk, we've more than doubled our capacity. Yet the new Bernoulli 90 is actually less expensive than our own Bernoulli 44, as well as other removable-disk drives. A lot less. And a lot faster, too.

But the best part is, it's all Bernoulli. Rugged, reliable, endless storage—exactly what storage-intensive Macintosh users demand.

More value.

The new Bernoulli 90 is now considerably less expensive than other removable drives of similar capacity. Granted, competitive pricing alone doesn't necessarily mean value—so consider what

else you *don't* get with other removable-storage drives.

You don't get a new, 19-msec effective access time. You don't get a technology that frees you from head crashes, or removable disks that can stand 1,000Gs of shock.

You don't get a drive that's compatible with every major operating system, and workstations. And you don't get Central Point's MacTools Deluxe or Dantz's Retrospect software.

In short, you don't get a Bernoulli.

More recognition.

Leading publications have given us welcome recognition, but with a 98 percent satisfaction rate, our



Welcome to the 90s.

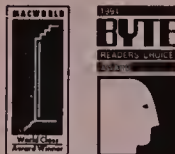
biggest
supporters
are Bernoulli users.

Our users enjoy worldwide support and a 24-hour* drive replacement service. To further protect their investment, we've designed the Bernoulli 90 to read 44MB disks. And we're instituting an upgrade program to help get every Bernoulli user into the 90s.

Call 1-800-777-4197†

Questions? We don't blame you. There's a lot more you should know about—like our free, 90MB disk offer, drive configurations, Bernoulli Technology®, and specific pricing. So we've prepared a free brochure that's yours with a phone call. Find out today what a welcome change Bernoulli can be. Before the 90s leave you behind.

IOMEGA®
Makers of Bernoulli



The Desk Inside

Using Workspace, a new combination work-manager and Finder replacement, feels a bit like interior-decorating your Mac. The first version includes an office with file cabinets and a desk where you open files of your projects and use icons that represent commonly used applications—for example, clicking on a calculator can launch Excel. Through a system of aliasing that works under System 6.0.X and 7.0, files can be assigned to multiple projects.

The first version also includes an outer space scene and an architect's chalk drawing



ONE OF WORKSPACE'S LESS-CONVENTIONAL ENVIRONMENTS. DOUBLE-CLICK ON THE PIZZA TO OPEN UP A FOLDER FULL OF WORK.

with the same functions as the office; later Ark will sell new environments separately, including a refrigerator and a desert island scene. Workspace lists for \$149. Ark Interface, 206/654-4127.—D.L.

ANALYSIS

The Truth about Statistics

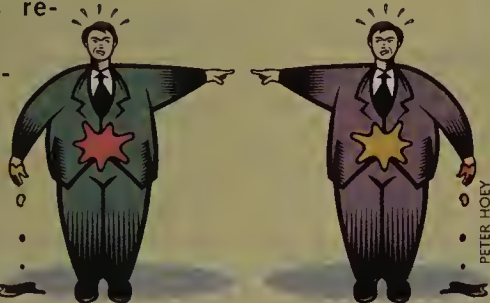
Statistics software users are shocked by two companies wrestling in the mud over charges of dishonest marketing, plagiarism and, most significant, inaccurate software.

Several months ago StatSoft released marketing materials comparing its still-unpublished Statistica/Mac with other Mac statistics packages. In response, SYSTAT, with a Macintosh package shipping for several years, wrote a 25-page booklet and sent it to the members of the American Statistical Association. StatSoft then published a 50-page rebuttal, and SYSTAT has responded to that.

SYSTAT's original booklet accuses StatSoft of plagiarizing its graphs; possibly using SYSTAT's and others' source code; hiring programmers who don't understand statistics; and producing wrong results in some analyses. StatSoft's rebuttal refutes many of SYSTAT's charges, attacks SYSTAT for being difficult to use, and accuses it of also producing wrong results in some situations.

Most scholars commenting online and in interviews seem unconcerned about the marketing and plagiarism charges; perhaps they are unaware of the legal morass of the database software market, with its Ashton-Tate/Fox Software lawsuits and its Software Business Practices Council, commonly called the Oracle-haters club. Scientists would regret living in the lawyer-driven world of the business software market.

But software reliability is the critical issue. When the Food and Drug Administration approves a new drug or the courts allocate congressional seats, the raw truth is that no one knows if the decisions are based on accurate numbers. There is no body that reviews statistics software reliability, and no comprehensive, accepted suite of tests. Worse, with the rise of user-friendly statistics software and personal computers, many people doing statistics are inadequately trained and unable to recognize mistakes—either their own or their software's. Copies of the booklets are available by calling SYSTAT at 708/864-5670 and StatSoft at 918/583-4149.—D.L.



Dayna's Net News

Dayna Communications is coming out with several new networking products for the Mac. NetMounter (\$99 or \$395 for a five-pack) is a utility for mounting Novell volumes without having Netware installed. NetMounter uses the AppleShare interface but does not provide NetWare print services. Network Vital Signs (\$499) monitors AppleTalk nets and reports on problems—for example, computers, printers, or routers dropping off the network. It also can alert an administrator to printers with empty paper trays. NetScope Probe (\$499) is a hardware device for detailed analysis of AppleTalk networks, and NetScope Console (\$449) is the software for it. With Probes installed on multiple network segments, a Console user can study all of an internet from one workstation. Dayna, 801/531-0600.—D.L.

Learning Sign Language

Foreign-language students use tapes; now sign-language students can use disks. E&IS Signware offers several programs for doing so: Fingerspeller, for learning to spell in American Sign Language (ASL); Fingerzoids, a game for honing your fingerspelling skills; Elementary Signer, for an introduction to ASL vocabulary and the culture of the deaf; and



SIGNWARE USER AND AUDIOLOGY PROFESSOR HUGO BEYKIRCH (STANDING) WITH DAVE BAUER AT THE UNIVERSITY OF NORTHERN IOWA.

News



BETA WAIT

Long-awaited products

Acius's 4D Server

Showed publicly January 1991. Current ship date projected: spring 1992 in France, three months later in United States.

FoxPro/Mac

Discussed publicly winter 1990/91; Fox says will go to beta soon, no ship date projected.

Interleaf 5

Discussed publicly October 1990. Current ship date projected: summer 1992.

Claris's MacWrite Pro

Announced spring 1991. Current ship date projected: late spring 1992.

AEC's FilePower

Announced August 1991; planned to ship winter 1991/92. Current ship date projected: summer 1992.

Bimillennium's HiQ series

Announced winter 1990/91; planned to ship spring 1991. HiQ ship date projected: winter 1992. Graphics and compiler ship date projected: after Sun version ships (Sun version projected for late summer 1992).

Alysis's SuperDisk 2.0

Original ship date: September 1991. Current ship date projected: early spring 1992.

Computerized Animated Vocabulary of ASL, for learning to sign 2600 words. All are primarily for friends and relatives of the deaf or others interested in learning sign language. Some E&IS Signware products are also available in Spanish and French. For pricing, write E&IS Signware at P.O. Box 521, Cedar Falls, IA 50613 or fax to 319/266-7800.—ANN GARRISON

JEFFERY FOSS DAVIS



STEVEN BARATZ

IOmega's BERNOULLI
MACINSIDER 90 IS THE FIRST
90MB REMOVABLE-
CARTRIDGE DRIVE FOR
THE QUADRA 900.

Iomega Removable Drive for Quadra 900

Iomega Corporation has designed a version of its 90MB Bernoulli-technology removable-cartridge drive that fits into an internal drive bay in the Quadra 900. The drive, called the Bernoulli MacInsider 90, is the first removable for the Quadra, which features a larger internal drive bay than other Macintoshes.

The 90MB internal drive was expected to begin shipping March 1. It lists for \$999. Iomega, 801/778-1000.—T.M.

PSI Adds Networking to Comstation Fax Modems

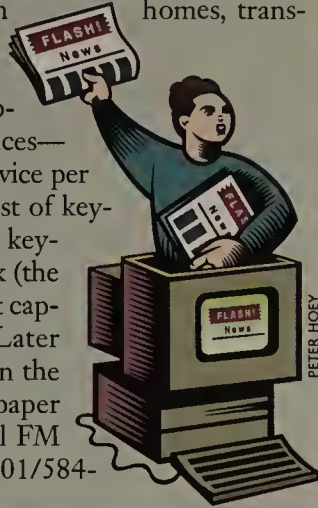
PSI Integration has begun shipping Net Upgrade, a combination ROM upgrade and software package that makes the company's Comstation One and Comstation Two fax modems into network devices on AppleTalk or Ethernet. The software includes a hot key that enables a user to send a fax over the network without leaving the application to go to the Chooser.

Both of the modems send and receive faxes at 9600 bps and data at 2400 bps. The Comstation Two adds V.42, V.42bis, and MNP5 protocols for faster effective transmission speeds and better error correction. Net Upgrade lists for \$299. PSI, 408/559-8544.—T.M.

TREND

The Paperless Newspaper

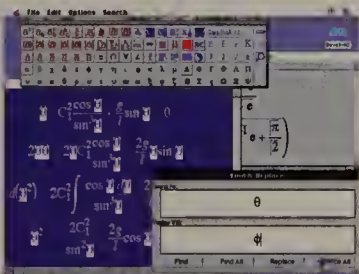
If you're tired of inky fingers or you want to select your news from a vastly bigger pool of stories than the local paper provides, open up the Electronic Newspaper. The system, which is designed for offices rather than homes, transmits Reuters, Dow Jones, AP, UPI, and other wire services and business information. Sites can subscribe to some or all of the services—monthly cost is about \$10 per service per person. Each user can set up a list of keywords. Stories containing those keywords are saved for a coffee break (the system lacks a boolean NOT, so it captures many irrelevant stories). Later plans include delivering stories on the office E-mail. Electronic Newspaper requires a satellite dish or special FM antenna. Mainstream Data, 801/584-2800.—D.L.



PETER HOEY

New Math

Expressionist, a system for displaying mathematics by computer, is being revised to version 3.0. The new version adds support for full color; mixing math fonts; and completely reprogramming the keyboard and expression palettes. Version 3.0 has a word processor-like ruler and the mathematical equivalent of style sheets; and it can generate PostScript, EPS, and PICT, or translate expressions into mathematical text. Expressionist 3.0 can also generate TeX files with user-defined translation tables or with Prescience's filter (Prescience will also develop translation filters for its Theorist and other math processors). A drop-in module for Microsoft Word 5.0 will make it possible to embed live Expressionist equations in a Word file. Expressionist 3.0 will list for \$199. Prescience, 415/543-2252.—D.L.



EXPRESSIONIST'S NEW
SEARCH AND REPLACE DIALOG
CAN FIND MATHEMATICAL
SYMBOLS INSIDE AN
EXPRESSION.

Accel-A-Writer IX Upgrades LaserWriter LS

The Accel-a-Writer IX from Xanté Corporation is an accelerator and PostScript upgrade board for Apple's Personal LaserWriter LS printer. The board uses a fast AMD 29000 RISC chip to increase processing speed. The Accel-a-Writer IX also provides a SCSI interface, 35 fonts, and space for up to 16MB of RAM.

The basic Accel-a-Writer IX lists for \$1295 for a 300-dpi version, while a version that upgrades the printer to 600 dpi

News

lists for \$1695. Both were slated to ship in February. Xanté also offers versions of the board for other Apple LaserWriters and HP's LaserJet series. Xanté, 205/476-8189.—T.M.

MacApp Revised for System 7

MacApp 3.0 is designed to simplify creating System 7-compatible applications by providing tools for adding balloon help, publish and subscribe, and core Apple events support. A new dependency mechanism simplifies telling one object that another object has changed—for example, when a user selects a radio button in a dialog box. Version 3.0 is written in C++ (which will be useful for porting Mac software to Windows when Apple releases MacApp for Windows), but 3.0 is also accessible by Object Pascal applications. It will include View-Edit, an interface design tool, and MacBrowse, a source code browser. For information call the Apple Programmers and Developers Association at 408/562-3910.—D.L.

J U S T F O R F U N

Decorating the Mac Interior

This month's product of fun is Wallpaper, which gives you new desktop pattern designs such as a parking garage in black and white, funky repeated faces in color ("The Panic of the Clones"), a fire pattern ("Baby's on Fire"), and over 500 other designs. If that's not enough, the product has an easel on which you can create your own patterns or edit the ones you have. With the sound option on, the program makes a choo choo sound when you drag a pattern from the selection and toots when you drop the pattern into the desktop pattern box or the easel. Wallpaper also has a randomizing feature so you can switch desktops every minute, every hour, once a day, or when you reboot. Brought to you by Thought I Could, Wallpaper retails for \$59.99 and is available now. Thought I Could, 212/673-9724.—CAROLYN BICKFORD



WALLPAPER FROM
THOUGHT I COULD LETS
YOU DECORATE A
MACINTOSH DESKTOP IN A
VARIETY OF WAYS.

NOTEBOOK SYSTEM

THE OUTBOUND



Meet the new Outbound™ Notebook Systems. Smaller, lighter and faster than their Apple® counterparts, the Outbound Notebook Systems sport an ingenious modular design that lets you "mix and match" the CPU, hard drive, and memory you want, *before and after you buy*. You get the performance you need right from the start. Then, as your hunger for power grows, you can upgrade your Notebook simply and easily with standard low-cost modules.

Don't give up anything

Outbound's "mix and match" system lets you choose from two to 14 MB of RAM, a hard disk from 20 to 120 MB, and lightning speeds of 20 to 33 MHz. With any combination, you'll have all the power and memory you need for your demanding applications. Naturally, the Outbounds are equipped with all of the ports you'd expect in a Mac®: a standard SCSI, communications, sound, ADB and printer. There is even a built-in microphone and speaker.

Enjoy Mac compatibility

Your Outbound Notebook is ready for action the minute you unpack the box, because the Macintosh ROM is already installed for compatibility with the thousands of Macintosh applications. Systems come with the memory conscious System 6.0.7 installed, and are completely compatible with System 7. And of course, all models include an internal SuperDrive™ equivalent 3½" floppy disk drive for working with high and low density Mac and MS-DOS diskettes.

Perform big business in small places

Small enough to fit in most briefcases, all models measure 8.5 x 11 x 2.1 inches, weigh only 6.25 pounds, and boast a full-size, silent keyboard. In tight quarters, use the keyboard mounted TrackBar™ to point and click. Or, add a mouse or other ADB pointing device. The backlit LCD screen is large and easy to read, and provides 17% more displayable area than the Apple PowerBook™ screens.

Notebook prices based on direct sales. PowerBook prices reflect published Apple retail pricing. Technical specifications and prices subject to change without notice. The Outbound name, logo and TrackBar are trademarks of Outbound Systems, Inc. Apple, Macintosh and Mac are registered trademarks of Apple Computer, Inc. PowerBook and Apple SuperDrive are trademarks of Apple Computer, Inc. All other brand and product names mentioned herein are trademarks or registered trademarks of their respective holders.

The perfect portable is the one you design yourself.

What the experts say:

"Outbound offers top-notch portable Mac."
 MacWEEK Magazine

"Outbound's notebooks are solid machines and deserve serious consideration by anyone contemplating buying a Mac notebook."
 Macworld Magazine

"Outbound's new Notebook System has the unique ability to grow along with your requirements - and your budget."
 MacUser Magazine

"Innovative touches, a high degree of compatibility, and moderate pricing make the Outbound Notebooks strong competitors with Apple's portable Macs."
 Portable Office Magazine

"For me, the Outbound Notebook is the better choice."
 BYTE Magazine

MODEL	THE OUTBOUND NOTEBOOK			MACINTOSH POWERBOOK		
	2000	2030E	2030S	100	140	170
Upgradeable CPU and Hard Disk	YES	YES	YES	No	No	No
Internal Floppy Standard	YES	YES	YES	No	Yes	Yes
Processor Speed	20MHz	25MHz	33MHz	16MHz	16MHz	25MHz
Maximum Hard Drive Available	120MB	120MB	120MB	20MB	40MB	40MB
Full Size Silent Keyboard and True Notebook Size	YES	YES	YES	No	No	No
Maximum RAM Available	4MB	14MB	14MB	8MB	8MB	8MB
Math Coprocessor	No	Optional	Optional	No	No	Yes
Maximum Silicon Disk Memory (RAM) Available	12MB	50MB	50MB	6MB	6MB	6MB
Price	2000/220 \$1999	2030E/220 \$2599	Call for price	100/220 Ext. Floppy \$2499	140/220 \$2899	170/440 \$4599

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You can order your Outbound Notebook System right from the folks who make it. Just call toll-free and use your credit card. And, when you call, be sure to ask about our low-cost financing.

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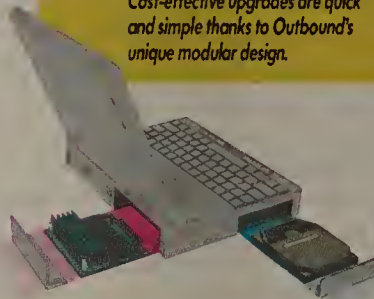
1-800-444-4607

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Saturdays MST. Visa, MasterCard and American Express accepted. Overnight shipping available.



Cost-effective upgrades are quick and simple thanks to Outbound's unique modular design.

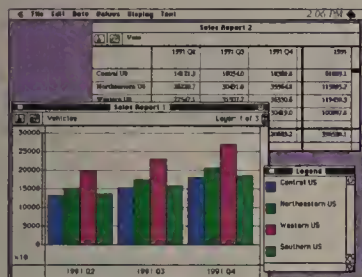


Outbound Systems, Inc. 4840 Pearl East Cir.
Boulder, Colorado 80301
Phone: 303.786.9200 Fax 303.786.8611

Knowledge and Power

An executive information system (EIS) summarizes the contents of a corporate database to give decision makers a vital-signs view of their company. It's an appealing idea, but most EISs require heavy programming to wire together and are often rigid and inflexible.

Minicomputer database vendor Cognos is trying to turn



POWERPLAY'S FORTE
IS DRILLING THROUGH DATA—
FOR EXAMPLE, CLICK ON THE
PINK BARS TO OPEN A GRAPH OF
WESTERN STATES.

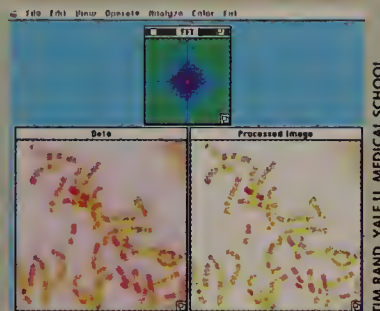
TREND

Sharing the Load

Instead of shelling out for a more powerful all-purpose Mac, some users are turning to compute servers, which put more muscle behind the computation-intensive tasks that need it.

Torque Systems' Tuplex software delegates tasks to RISC-based compute servers now available or under development at several companies, including Torque itself; Meiko Scientific (415/952-9900); Okidata Microsystems (508/872-4825); Sixty-Eight Thousand (408/438-1777); and Taurus Technology (804/873-2700). Prices range from about \$10,000 for a single i860 processor unit to about \$200,000 for a unit with hundreds of processors (Torque says each processor delivers about ten times the throughput of an 80486 or a 68040). Tuplex devices are not platform-specific, so they can be shared on a network by Macs, PCs, and Suns. (A few companies are doing single-user NuBus boards.)

Torque is targeting CAD, 3-D rendering, financial analysis, and prepress for Tuplex. Several Mac software products are being revised to work with Tuplex compute servers, including the scientific visualization tool SpyGlass from SpyGlass, Inc. (217/355-1665); Signal Analytics' scientific image-analysis package IP Lab (703/281-3277); and Knowledge Software's PostScript processor Magic RIP (914/762-7667). Torque Systems, 415/321-1200.—D.L.



PUTTING TUPLEX TO GOOD
USE: SIGNAL ANALYTICS' IMAGE
PROCESSING LAB SHARPENING
AN IMAGE OF CHROMOSOMES.

TIM RAND, YALE U. MEDICAL SCHOOL

GreatWorks Reintegrated

GreatWorks, the first Microsoft Works challenger out the door, has been revised to version 2.0. The first version was widely criticized for being too much like Works, with its word processor, spreadsheet, and other modules operating independently as mini-applications. For System 7 users, version 2.0 has better integration through publish and subscribe, and its text ruler and draw tools are available in all modules. The new version also adds paint tools and 8-bit color support, print preview, and an envelope-printing utility. GreatWorks lists for \$299. Symantec, 408/253-9600.—D.L.

an EIS into a packaged commodity with PowerPlay. PowerPlay uses a list of database field names and information about how fields are related—for example, Q1, Q2, Q3, and Q4 make up 1991—to generate multidimensional tables and many graph types, all of which can be easily sliced and diced, and all providing complete drill-down capabilities.

PowerPlay uses exported ASCII data; it does not communicate directly with a database. PowerPlay lists for \$695. Cognos, 617/229-6600.—D.L.

Fusion's 040 Accelerates the IIx

Fusion Data Systems has introduced the TokaMac II FX, a 33MHz 68040 accelerator designed to approximately double the performance of the Macintosh IIx. The board comes with both a PDS and a NuBus interface to increase bus throughput inside the IIx. Fusion also designed software and hardware, included with the board, to accelerate NuBus calls and provide faster block transfers.

The TokaMac II FX also has a 128K cache, four times the size of the cache in the IIx. The list price for the accelerator board will be \$3995. Fusion expects to begin shipping in April or May. Fusion, 512/338-5326.—T.M.

The Critical Eye

What do Ronald Reagan and the GM Saturn have in common? Advertising for both was produced by the Hal Riney and Associates Agency. On the interactive videodisc The Critical Eye: Inside Advertising, a Riney Agency executive discusses the creation of the GM Saturn commercials. Critical Eye users can also try their



AN OPENING SCREEN FROM
THE CRITICAL EYE, DESIGNED TO
TEACH HIGH SCHOOL
STUDENTS TO THINK ABOUT
ADVERTISING AND PROPAGANDA.

News



VIRUS WATCH

CURRENT VIRUSES,
TROJAN HORSES, AND WORMS
AFFECTING THE
MACINTOSH COMMUNITY

Zuc C

TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 10/91
INFO: A Zuc clone
IMPACT: Nondestructive;
infects applications and
system files; renders cursor
inoperable

HC

TYPE: Data Virus
FIRST LISTED IN VIRUS
WATCH: 6/91
INFO: Infects HyperCard
stacks
IMPACT: Causes the Mac to
hum oddly

nCam

TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 5/91
INFO: An nVIR clone
IMPACT: Nondestructive;
infects applications
and systems files; can
cause crashes

hand, pushing buttons to plan and execute a life-style campaign for selling candy bars—making all the decisions that lead to TV images of milk chocolate melting behind athletic young fun-lovers at play.

Created for high school media education, Critical Eye deconstructs product advertising, political advertising, and public service announcements. The disc was produced for Strategies for Media Literacy (SML) by the Bay Area Video Coalition. SML will offer the disc at cost, for about \$40. SML, 415/621-2911. —ANN GARRISON

The first monitor for people who know which red is the right red.



NEC, who brought you the first color laptop computer and affordable color printers, now brings you the only color monitors with the AccuColor Control System, an unprecedented step in user-adjustable color accuracy.

You can match the red on your letterhead, the red on a slide, even the red on your favorite tie. And you can do it easily.

With NEC's new MultiSync® FG™ series monitors.* Our revolutionary AccuColor™ Control System allows you to adjust image colors to your exact needs.

This new color calibration system lets you match colors on your screen to Pantone® or any other color reference system. You can also match on-screen colors to those delivered by your color printer, another monitor, or a service bureau output.

Whether your monitor needs are for general business use, multi-media applications, or color prepress, you're probably relying on color more than ever. And we've made it easier than ever to match the color you need. You can actually set the red, green, and blue color guns in precise digital steps to adjust the colors on the display.


The FG series also gives you sharper graphics and text. So even if you're not one of those people who knows which red is the right red (top row, fourth column), the answer to your monitor needs couldn't be clearer.

Call 1-800-NEC-INFO. (In Canada: 1-800-343-4418.) For immediate info via fax, call NEC FAST FACTS, 1-800-366-0476. Request #1521.

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NEC

MultiSync 4FG

Because  is the way you want to go.

NEC

Now Available
Personal Laser Writer

Apple & HP Make Great 300 dpi Printers. Xante Turns Them Into Lightning Fast 600 dpi SuperPrinters.

Now easy-to-install Accel-a-Writer™ controllers from Xante® turn any Apple® LaserWriter or HP® LaserJet into a true 600 x 600 dpi PostScript® compatible SuperPrinter.

Affordably.

Whether you're the owner of a LaserWriter® or LaserJet®, the Accel-a-Writer delivers other important advantages, too. Like an advanced RISC processor that makes your printer assemble text and graphics up to 12 times faster. Expanded connectivity for simultaneous operation of Apple Macintosh®, IBM®/compatibles and other popular workstations. A SCSI port to plug in external hard drives for permanent storage of downloadable fonts. And dual page processing which gives your printer the ability to print a page while assembling another. If you want all the speed and connectivity but don't currently need 600 x 600 resolution, Xante even makes an Accel-a-Writer for you at just \$1295!

Call Xante toll-free to order the Accel-a-Writer you need today. And get the professional advantages of increased resolution, speed and connectivity, affordably.

Accel-a-Writer™

FEATURES	ALL APPLE LASERWRITERS		ALL HP® LASERJETS	
	without Accel-a-Writer	with Accel-a-Writer	without Accel-a-Writer	with Accel-a-Writer
PostScript® Compatibility	✓	✗		✗
True 600 x 600 dpi		✗		✗
RISC Processor		✗		✗
Standard 6MB RAM		✗		✗
SCSI Connectivity	✓ [Only on NTX, III, IIg]	✗		✗
Simultaneous Interfacing (AppleTalk®, serial, parallel)		✗		✗
Dual Page Processing		✗		✗
Advanced Memory Management		✗		✗

Free Video Tape!

"How to Install your Accel-a-Writer Fast and Easy."

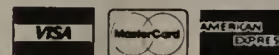
Call 1-800-926-8839 To Order



"The Accel-a-Writer II board turns any LaserWriter II into a graphics speed demon..."
MacUser Magazine, Sept. 1991



30 Day Money Back
Guarantee!



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Circle 119 on reader service card



BUG REPORT

PowerBooks Floppy drives in some 140s and 170s unable to initialize floppy disks, recognize formatted disks, or read or write to floppy disks.

Crash Barrier 1.0 Crashes Mac when copying from disk to disk; also incompatible with many INITs. Version 1.03 now available; Casady & Greene will send to registered users on request.

DOSMounter 2.04 Mac IIsi does not respond to Mac or DOS floppy disks when inserted. Version 2.05b available free from Dayna on request; major upgrade 3.0 (\$24.95) now shipping.

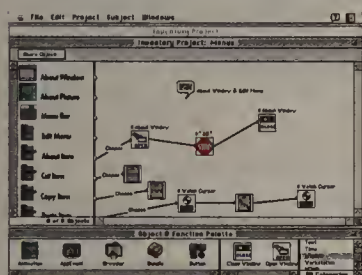
Canvas 3.0 Incorrect calculation of area for some polygons; erratic screen refresh. Version 3.03 now available; Deneba will send free to registered users on request.

MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE **HOW TO CONTACT MACWORLD**.

Serius Plans

Serius just got a shot of cash from Novell and has a series of new object programming products ready to launch.

Version 3.0 of Serius Programmer and Serius Developer have a scripting language called ObjecTalk, so it is no longer necessary to visually connect icons of functions or objects like windows, menus, and dialog boxes. The new versions also add a kind of super-object called a subject for such items as a complete functioning menu



DEVELOPING A PROGRAM IN SERIUS 3.0. THE NEW VERSION ADDS SUBJECTS TO THE OBJECT-ORIENTED PROGRAMMING VOCABULARY.

bar. Serius plans to sell sets of high-level objects for databases; communications; multimedia; running HyperCard XCMDs; and interapplication communication. Developer (\$595) and Programmer (\$395) will ship with the database set, along with calendar and QuickTime objects. Serius, 801/261-7900.—D.L.

Designing for the Real World

Engineers at Keithley Instruments outside Cleveland have begun working with Assembly View to analyze part-usage and assembly-time for new designs. This planning-ahead technique, called design for manufacturing, is ignored at many companies—in fact, engineers often speak of “throwing the design over a wall” to manufacturing—but on one recent project Assembly View helped Keithley winnow 131 parts down to 76 parts and cut assembly time by one-third.



A LINE WORKER ASSEMBLING COMPONENTS FOR ONE OF THE ELECTRONIC DEVICES PRODUCED AT KEITHLEY INSTRUMENTS.

Assembly View does not import files directly from mechanical CAD software, but instead represents parts and subassemblies iconically to estimate assembly time and to draw attention to bottlenecks.

Assembly View 2.0 is sold bundled with Custom View 1.0, a high-level tool for modifying Assembly View, for \$5000. Sapphire Design Systems, 415/321-3595.—D.L.

Home 3-D

How do you represent 3-D spaces on a computer screen without complex 3-D modeling software and high-end machines? While doing research at Apple's Human Interface Group last summer, NYU professor Dan O'Sullivan came up with a low-end solution. He

News

wrote a HyperCard program to control movements of a video camera on a tripod, created a QuickTime movie of his living room, and then wrote a stack for navigating through the movie. He turned objects that appear in the movie into buttons that can be clicked for close-up movies. O'Sullivan's unnamed video-control stack, which is not commercially available, could be used for on-disk real estate advertising or wandering through Bloomingdale's. O'Sullivan would like to create QuickTime movies of the inside of Versailles and add audio ghosts.—ANN GARRISON



PETER HOEY

DESKTOP LIBRARIAN

Books on Publishing

This month we look at a mixture of books on publishing.

◦ *Publish Magazines & Newspapers with a Macintosh Computer*, by Harris Smith (1991, \$16.95). This 150-page book takes the Macintosh beginner through all the stages of creating a community publication.



SCOTT PETERSON

THIS MONTH'S PAPER PILEUP INCLUDES THREE BOOKS WITH DIFFERENT APPROACHES TO DESKTOP PUBLISHING.

Chapters cover layout, advertising, circulation, accounting, and promotion, among other topics. Upper River Press, 508/356-3732.

◦ *Desktop Publisher's Survival Kit*, by David Blatner (1991, \$22.95). Intended as a guide through the jungle of desktop publishing, this volume includes explanations of how things work followed by practical tips on graphic file formats, fonts, scanning, color, and troubleshooting. Peachpit Press, 510/548-4393.

◦ *The QuarkXPRESS Book, Second Edition*, by David Blatner and Keith Stimely (1991, \$27.95). This nearly-600-page tome goes into exquisite detail starting with QuarkXPRESS's structure and interface, next explaining how to build documents, and ending with practical basics. Peachpit Press, 510/548-4393.—T.M.

HP LaserJet IIISi Goes EtherTalk

As many organizations upgrade to Ethernet to speed up their networks, Hewlett-Packard is adding to its lineup an EtherTalk version of its 17-pages-per-minute LaserJet IIISi printer for Mac workgroups. The printer includes a high-speed RISC processor, HP's Resolution Enhancement technology, PostScript, 35 internal fonts, and 5MB of RAM.

The EtherTalk interface supports data transfer at up to 10Mbps over Ethernet, compared with 230Kbps for AppleTalk. The HP LaserJet IIISi printer for the Macintosh with EtherTalk lists for \$6995. HP expects to begin shipping the printer in February. Hewlett-Packard, 800/752-0900.—T.M.



Now there are two ways to make an 11"x 17" sheet of paper fly.

The new LZR 1560 from Dataproducts is a complete departure from ordinary laser printers. At 15 ppm it's not only faster than most laser printers, it can also deliver output up to 11" x 17". Which means it can print spreadsheets, illustrations—any two-page layout—in the time it normally takes to process a letter-size page.

This kind of performance is the result of combining two powerful innovations. Namely, a RISC-based

language that delivers PostScript's vast graphic capabilities faster than ever before.

Plus, while most laser printers

300 dpi can be done with a click of the mouse.

Imagine creating two-page desktop publishing layouts without cutting and pasting. Or finally getting your full production timeline on a single page that has *legible* 6-point type.

You'll still

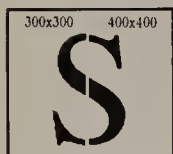
have a desk to work on too, since the LZR 1560 is the smallest 11" x 17" printer available. And with one, two or three paper input tray models available, even your biggest jobs are handled easily.

So call 1-800-334-3174 for the name of your nearest Dataproducts dealer. And discover why the LZR 1560 is the only way to fly.

11" x 17" Laser Printer Market Snapshot

SPECIFICATIONS

Manufacturer/Model	Resolution (DPI)	Speed (PPM)/Processor	Page Description Language	List Price
Dataproducts LZR 1560	300x300 OR 400x400	15 Weitek 8200 RISC	Adobe PostScript Level 2 & PCL4	\$5,695
QMS PS2210	300x300	20 Motorola 68020	Adobe PostScript	\$9,995
LaserMaster 400XL	400x400	20 None	Microsoft TrueImage	\$9,995
Varityper VT600W	600x600	7 Motorola 68020	Adobe PostScript	\$16,995
DEC PrintServer 20	300x300	20 N/A	Adobe PostScript	\$25,247
ATI LC6020	300x300	20 Motorola 68020	ATI LaserDrive & PostScript	\$15,995



400 dpi offers greater halftone range and sharper images than standard 300 dpi.

controller, for quicker rendering of fonts and graphics, and PostScript® Level 2, an advanced printing

give you only "enhanced" 300 dpi, ours gives you *true* 400 dpi. So you get outrageously crisp and clean text and graphics. And switching back to



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Circle 191 on reader service card

Price breakthrough!

- 400 DPI
- Adobe PostScript Level 2
- 11" x 17" format
- \$5695!!

Instant Recognition

Tasks such as typing the contents of a pile of forms into a database or reconstructing a page layout from hard copy may soon be automated. CTA's TextPert Developers' Toolkit optical character recognition (OCR) tool kit is an OCR engine that programmers can build into applications for performing such tasks.

CTA will publish two Toolkit-based products: TextPert Addition, a \$99 Aldus Addition for re-creating scanned pages as PageMaker files; and TextPert 4d Externals, a \$99 4th Dimension add-on to import scanned data into database fields.

CTA is also developing a NuBus OCR board that it claims will recognize about 80,000 characters (50 pages) per minute. A special version of TextPert included with the \$3995 board can run batch jobs on stored TIFF files. CTA, 203/786-5828.—D.L.



TransWarp 040 Accelerator

Applied Engineering has announced two accelerator boards: the TransWarp 040 for NuBus Macs, and the TransWarp LC for the Macintosh LC. The TransWarp 040, based on a 25MHz 68040 processor, speeds up math operations by as much as ten times and lists for \$3099. It includes both write-through and copy-back caching and comes with software that can be set to turn off the accelerator when using an application that is incompatible with the 68040. The software allows you to update the list of incompatible applications. The TransWarp 040 requires at least 1MB of RAM on the accelerator, and at least 1MB of RAM on the main logic board of the system. The accelerator has eight SIMM sockets for RAM.

The TransWarp LC offers a choice of 33MHz, 40MHz, or 50MHz 68030 microprocessor; the 50MHz version speeds up the LC by up to three times. It lists for \$1499 for the 33MHz model, \$1990 for 40MHz, and \$2195 for 50MHz, all including a math coprocessor. All the accelerators are currently shipping. Applied Engineering, 214/241-6060.—T.M.

Teaching about Cells

With a 6-year-old daughter, Carolyn Moyer was dismayed by the quality of science teaching for youngsters. To improve the situation, Moyer, a former



ANTON VAN LEEUWENHOEK, THE FATHER OF MICROSCOPY AND BACTERIOLOGY, APPEARS IN THE EDUCATIONAL PROGRAM "CELL"EBRATION.

professor of veterinary pathology, started Science for Kids with educator Roberta Pettit and artist Linda McCorkindale to develop a series of interactive videodiscs for elementary science learning. The first, "CELL"ebration, is a CDROM designed to teach first-, second-, and third-graders that the cell is the basic construct of all living things. It runs on any Mac with 2MB of RAM and a CD ROM player. To make sure kids have fun while they learn with "CELL"ebration, Moyer consulted with her daughter and other children on interface design. Pricing was not set at press time. Science for Kids, 919/945-9000.—ANN GARRISON



THE SUPERMATCH 17 MULTIMODE COLOR DISPLAY IS A 17-INCH MONITOR FROM SUPERMAC.

SuperMac Intros 17-Inch Monitor

SuperMac Technology has brought out the SuperMatch 17 Multimode Color Display, another entry into the low-cost, midsize monitor fray. The 17-

News

inch display lists for \$1199, has three selectable resolutions, and works with the NuBus Macs in conjunction with the appropriate 8-bit or 24-bit SuperMac display adapter.

The three display resolutions are 832 by 624 for WYSIWYG, 640 by 480 for larger type, and 1024 by 768 for spreadsheets. When connected to a Quadra, the monitor can display 24-bit color at 832 by 768 using only the Quadra's internal display adapter.

The company also introduced the Spectrum/24 Color Graphics Card, a 24-bit NuBus graphics adapter that also lists for \$1199. The adapter was scheduled to ship in February, with the monitor to follow in May. SuperMac, 408/245-2202.—T.M.

Monitor Connects through SCSI Port

Sigma Designs is bringing out the PowerPage, a 15-inch monochrome portrait monitor that incorporates an internal display adapter and connects to a PowerBook or low-end Mac through the SCSI port. The display adapter electronics are contained in the monitor housing, so there is no separate box to carry. The PowerPage monitor meets the Swedish MPR II guidelines for reduced magnetic-field emissions.

The monitor comes in two versions: a platinum model with the usual SCSI low-end desktop Macs, and a granite-color model with the new PowerBook SCSI connector. The color temperature of the two models is set to match the systems they work with. The platinum model lists for \$995, while the PowerBook version goes for \$1095. Sigma expects to begin shipping both products in March. Sigma Designs, 510/770-0100.—T.M.



TURKEY SHOOT

DESIGN FLAWS NOTED

Microsoft Project Well the first task's connected to the second task, and the second task's connected to the third task, and the third task's connected to the . . . first task? Hmm.

Caere's Typist Plus Graphics Anyone for a glass of port? Savor the bouquet of those IBM-style double-clickable pop-up menus. And enjoy the complex palette of its lasso, which only creates masks.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.

Introducing the LabelWriter II. The fastest and easiest way to make labels.



LabelWriter II Plus pictured. Actual size: 6.5" x 4.5" x 7" (HWD).

The LabelWriter® II brings a whole new concept to desktop label printers: speed. It's at least five times faster than any other label printer available. It also offers you very sharp resolution, accommodates large 350-label rolls, and for the first time, gives you the option of white or clear labels.

This mighty little printer comes with powerful software (an application and DA) that lets you create, format and print a label at any time, without interrupting your main programs. You can also combine text in any font and style with clip art and graphics.

The LabelWriter II software also manages mailing lists, prints postal bar codes, bar code 39, and serialized labels. There's even a print driver that lets

you print directly from your favorite programs.

For bigger jobs, there's LabelWriter II Plus. Same small size, but with the ability to print on larger 2¼" x 4" and 3.5" disk labels.

The LabelWriter II printers are compatible with System 7, Adobe Type Manager™ and

TrueType™. An AppleTalk® Interface is also available.

For more information or a dealer near you, call 1-800-4-COSTAR or 1-203-661-9700.

The LabelWriter II and II Plus. The fastest, most efficient way to make great-looking labels.



LabelWriter II



LabelWriter II Plus

Speed	3.5 seconds per label	7 seconds per label
Print Resolution	138 dpi x 138 dpi	138 dpi x 138 dpi
Label Capacity	up to 350 labels per roll	up to 700 labels per roll
Label Sizes	Address (1½" x 3½")	Address (1½" x 3½"), Shipping (2¼" x 4"), 3.5" disk labels.

NEC to Bundle Radius Graphics Boards

In the past few years, several major monitor manufacturers that had previously sold only into the IBM PC market have turned their eyes toward the increasingly lucrative Macarena. Now, to offer a more complete solution to Macintosh users, NEC Technologies (NECT), a U.S. affiliate of Japanese conglomerate NEC Corporation, has entered into a technology agreement with Radius to include future Radius graphics adapters with NECT's latest MultiSync FG line of monitors.

Radius will provide a series of graphics boards designed to work with the FG series. The agreement constitutes a major endorsement of the Macintosh market by NECT, which previously sold its MultiSync line mostly in the PC market. Several of the monitors were always intended for the Mac, but customers were previously required to find their own adapters to work with them. NECT, 508/264-8000.—T.M.

QMS Unveils 17-ppm Printer with Brains

QMS has brought out the QMS-PS 1700, a 17-ppm laser printer with automatic emulation sensing and the capability to receive files from Token Ring or Ethernet networks, with the latter network supporting DECnet, TCP/IP, Novell NetWare, or EtherTalk protocols. The printer includes an Intel 80960 RISC chip for high processing speed; produces 300-by-300-dpi or 600-by-600-dpi resolution; and recognizes files produced for the PostScript, HP PCL IV, and HPGL



THE QMS-PS 1700 IS A 17-PPM LASER PRINTER THAT PRINTS BOTH POSTSCRIPT AND PCL FILES.

7550 printer languages. With the optional Ethernet interface and DECnet protocol, the QMS-PS 1700 also supports LN03 PLUS/ANSI.

The printer's Canon NX

engine has a 1000-sheet input tray and can handle legal-size paper. The QMS-PS 1700 was scheduled to begin shipping in late January at a list price of \$7995. The DECnet Ethernet interface and the TCP/IP Ethernet interface each list for \$1995. QMS, 205/633-4300.—T.M.

Storm Adds QuickTime to Compression Board

To add QuickTime support to its existing JPEG compression board, Storm Technology has designed a software package called QuickPress, which the company says will provide the first true acceleration of JPEG for QuickTime. The compression board, called the Storm Card, includes a 60 MIPS DSP chip and is optimized for JPEG compression and decompression; optional third-party appli-

News

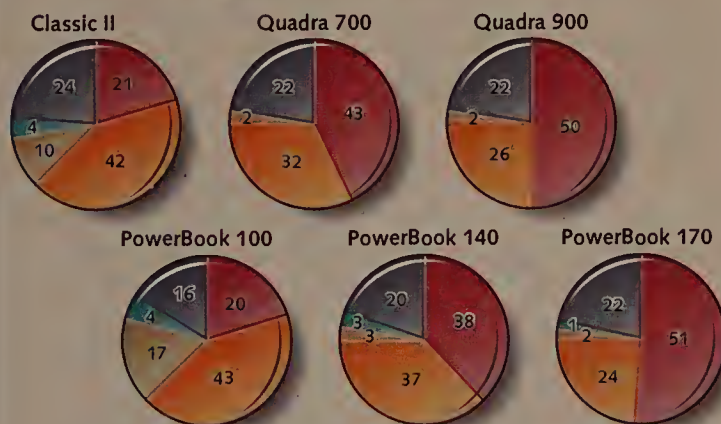
cation software also lets the Storm Card operate as a fax modem or do sound compression.

When combined with QuickPress, the Storm Card will accelerate all QuickTime applications designed to use JPEG compression, according to the company. Storm expects the QuickPress software, tentatively priced at \$199, to ship in the first quarter. The Storm Card alone is \$999, but new pricing was being considered at press time. The company is also considering bundling the hardware and software together for under \$1000. Storm Technology, 415/961-1111.—T.M.

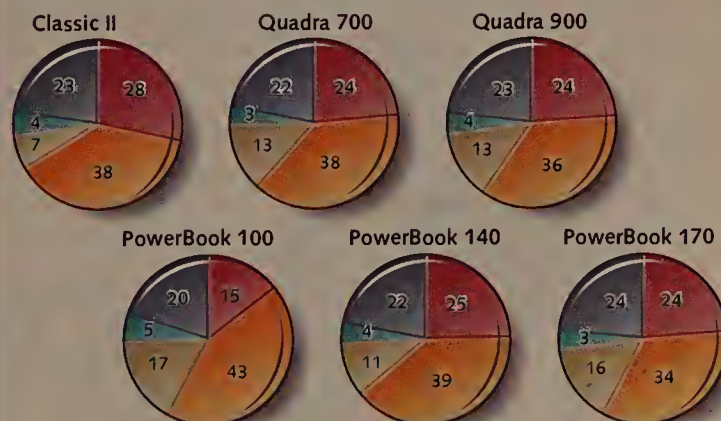
Reader Survey: New CPUs

Level of satisfaction with features

Very satisfied (dark red) Satisfied (red) Not satisfied (orange) Not at all satisfied (light orange) Don't know (grey)



Level of satisfaction with value



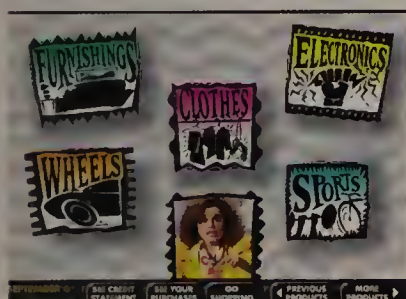
This month's survey was mailed to 750 readers; 398 usable responses were returned. (Percent totals may not equal 100 due to rounding.)

You've Got to Play to Pay

Two California high schools are using Smart Money, a fast-paced interactive-video game, to introduce students to the basics of money management. Beneficial Management commissioned award-winning filmmaking company Adair & Armstrong to create the game—a first for both companies.

Equipped with a good salary and two credit cards, students outfit themselves and a brand-new condo for a year—about an hour in game time. Video characters pop up to comment on buying decisions, tempt the cautious to buy top-quality items, and offer advice on bill paying. Players who get overextended risk loss of credit and even repossession.

Smart Money is currently available only on videodisc, but Adair & Armstrong expects to convert it to QuickTime this spring. Pricing was not set at press time. Adair & Armstrong, 415/826-6500.—MARJORIE BAER



WHERE DO YOU WANT TO SPEND YOUR MONEY? SMART MONEY HAS LOTS OF TEMPTATIONS TO DRIVE TEENS DEEP INTO DEBT.

Microsoft Word 5.0 now

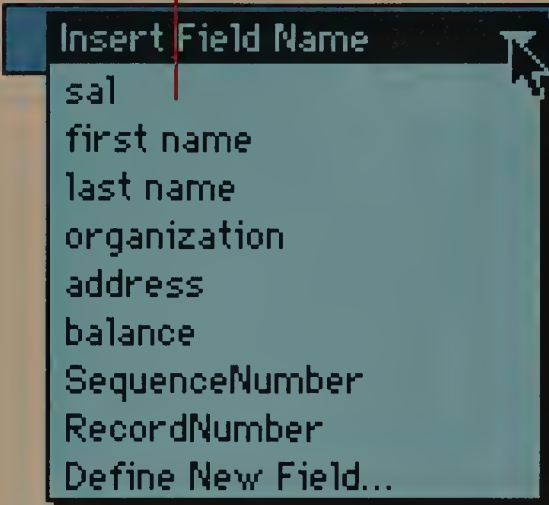
Click these drop-down lists to choose fonts and point sizes.

Click here to make text bold, italic, or underlined.



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Use the buttons to merge your document — it takes only one click.



Insert Key word

Avoid mistakes with the automatic error checker.

Place charts, graphs and text boxes anywhere on the page so text wraps around them.

AIRLINE OPERATING COSTS

Category	Cost
depreciation	40
fuel	25
airplane	18
flight crew	5
other	14
TOTAL	

Airline operating costs are costs. The average U.S. domestic total operating budget on international related costs, including cab fees, insurance, passenger

The remaining 48% consists of interest, flight crew, maintenance costs, accounting operating costs, are primarily maintainability designed in

In evaluating specific aircraft models, the committee found operating cost-per-seat model. In addition, costs were an introductory investment.

FUEL EFFICIENCY

As seen in the chart and table above, the number one direct ownership itself, is fuel.

In order to calculate the fuel efficiency of the aircraft under formula:

$$Y(t) = A(1 - e^{-B(t-C)})$$

To solve for the fuel efficiency, we used the standard standard

$$Y_{avg} = \int_{t_1}^{t_2} \frac{Y(t) \sin[Y(t) - \phi]}{t \sqrt{1 - \omega \tan[Y(t) \phi]}}$$

or, in our computer model:

$$Y_{avg(t)} = \sum_{j=1}^n \frac{Y(t_j) \sin[Y(t_j) - \phi_j]}{t_j \sqrt{1 - \omega \tan[Y(t_j) \phi_j]}}$$

and made certain assumptions about our anticipated passenger the fuel efficiency of the three models under consideration

Use the full-featured Equation Editor to build and automatically format complex mathematical equations.

¹We will be between 1/2 full and full most of the time because of c

Microsoft Word 5.0 lets you create polished, professional-looking documents faster and easier than ever before. Whether you need to dash off a quick memo or produce a complex report with multiple columns and illustrations, Word 5.0 gives you the tools you need. And this all new version of Microsoft's award-winning word processor makes it incredibly easy to apply the full power of Word 5.0 to everyday tasks.

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The new Ribbon control panel in Word 5.0 lets you make those everyday changes simply by clicking a button. Change the number of columns, select a font, alter a point size or type style. Move blocks of text with a simple drag and drop operation. Use Word's outliner to create structured documents. The new Find File module lets you search by keyword, author, or creation date, and preview the contents without actually opening a file. The Work Menu keeps a list of recently used files, so you can select and open a document quickly. Search and Replace works with any combination of text, formats, styles, and special characters. Style Sheets let you save frequently used formats, and

Glossaries make entering frequently used words and phrases effortless. The Grammar and Spelling Checker keep your writing crisp and precise, and the Thesaurus helps you find the words to express your thoughts clearly and correctly.

Tackles tedious tasks with ease.

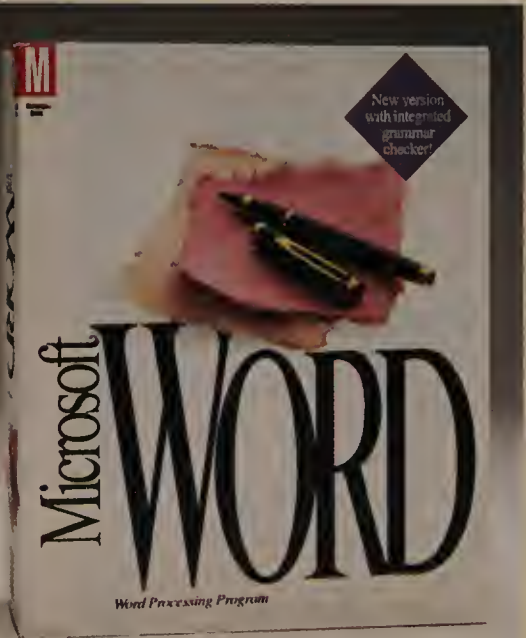
Word 5.0 includes a Table Editor that lets you easily mix text, numerical data, and

graphics. It even calculates values, and imports Excel data as a formatted table.

The Equation Editor generates complex mathematical expressions that you can incorporate into your document. Long documents are no problem, because Word 5.0 links files (such as chapters of a book). It numbers the pages consecutively, and generates tables of contents and indexes. The Print Merge Helper simplifies label printing and mail merge operations, with an automatic error checker.

Communicate with flair.

Word 5.0 has basic page layout capabilities, including multiple columns, variable-width columns, and text wrap around graphics boxes. For adding the finishing touches, Word 5.0 imports graphics, and offers tools to rotate, flip, scale and crop them. Place graphics boxes anywhere on the page, and text will wrap around them. Drawing tools allow you to create original illustrations, or add design elements right from within Word. Shading effects and a library of borders add dramatic impact.



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Click the drawing button to create your own pictures in Word.

Click here to transform your text into multiple columns.



Attention Microsoft Word Owners!

6

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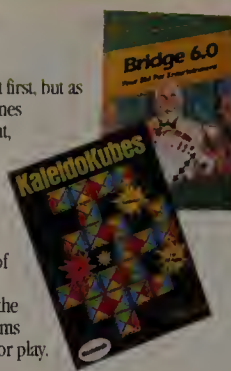
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Bridge 6.0

⑦ Now you can play a rubber of Bridge 6.0 with the Mac's three players. Bridge 6.0 handles all the bookkeeping and tactfully informs you of any mistakes in bidding or play. Even saves hands for replaying and analysis. Publisher: Artworx ENT0303



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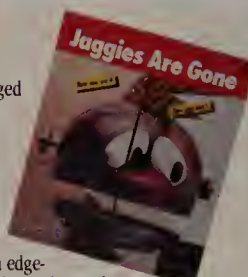
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⑦ At last, a 1-2-3 spreadsheet that is designed exclusively for the Macintosh computer. 1-2-3 for Macintosh takes full advantage of the rich graphical environment of Macintosh while delivering significant new spreadsheet features...And of course it's compatible with other new versions of 1-2-3 and Excel. A whole new kind of 1-2-3 created expressly for Macintosh! The result is a rich design that makes even the most complex spreadsheet tasks easy. 1-2-3 for Macintosh sets a new standard for what a Macintosh spreadsheet should be. System requirements, any Macintosh with a hard disk. 2MB RAM under System 6 or later. 3 MB RAM under 7. Publisher: Lotus Development BUS0188

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⑦ JAG works in the background, removing jagged edges from PICT files automatically, producing pixel perfect 8-bit and 24-bit still images and animations. Works with images created in color paint applications and with scanned images. With edge-detection scheme, JAG produces sharp, clear images of superior quality to those produced by edge-blurring filters. When working with 3D rendering software, JAG saves time and production costs by letting you work with antialiasing turned off, while JAG does the post production job. Publisher: Ray Dream GRA0291



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The WristSaver cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver MousePad provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand. Manufacturer: LB Innovators WristSaverMousePad ACC0635 \$15. WristSaver ACC0560 \$15. Bundle BND0033 (Available in Gray, Black, Red or Navy)

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\$129



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Smartcom II Mac 3.3

Smartcom II for the Macintosh is praised by software reviewers and users as the most reliable, easiest to use Mac communications software available. Smartcom II takes full advantage of the power and unique graphics capabilities of all Macintosh computers including special support for System 7, provides support for all popular modems, and offers a simple, but powerful, interface to the advanced features of Hayes Smartmodem™ and V-series® products, including ULTRA™ 96 and ULTRA™ 144. It supports TTY, VT™ 52/100/102, ANSI, Prestel™, and Show Controls terminal emulations and Autotype Protocol, XModem (XModem Standard, XModem CRC, XModem 1K), YModem, YModem-G, ZModem, Kermit™, CompuServe™ B Plus file transfer protocols. **Publisher: Hayes COM0015**

\$84

NEW



Active Memory 2.0

Active Memory is a continuously running personal organizer for Macintosh computers enabling you to manage personal information as well as collaborate in real time with other users over a LAN and through remote Appletalk. Active Memory functions in the background of your Macintosh as a personal database and can be configured to manage your priorities and personal information the way you want it. You can teach Active Memory to automatically prioritize information and carry over unfinished tasks to the following day. When running Active Memory under System 7, you can also publish and subscribe to other applications to get immediate dynamic information. **Publisher: ASD Software BUS0207**

\$129

First Things First 2.0

New Version!

An extremely fast and easy-to-use way to schedule day-to-day tasks, appointments and priorities. First Things First is always instantly available by clicking on a revolutionary Clock-Icon that floats on top of any active window or application, or in the menubar. View activities by priority level or schedule. Reminder appears as floating icons anywhere you want. Small calendars make for easy entry and rescheduling of activities in up to 20 categories. System 7 friendly, runs on System 6.

Publisher: Visionary Software BUS0190

\$45



DayMaker

DayMaker offers you a complete solution for personal organization. It is the first Macintosh product to combine scheduling, appointments, to-do lists, calendars, alarms, Gantt charts, free form addresses, phone numbers, categorization, and full printing to personal organizers; all in one fast, elegant, and easy-to-use package. View or print all your important information according to your own categories. View calendars containing only items relating to a particular project, person, or switch between categories, instantly. Keep track of what's been done and what hasn't with "ticker" reminders and alarms. A must for Macintosh PowerBook users. **Publisher: Pastel Development BUS0199**

\$65



Smart Alarms 3.07 with Appointment Diary 3.1

Let New Smart Alarms 3.07 take care of your daily schedule. Just enter your appointments into the Diary and Smart Alarms will remind you of your important appointments. New features include, a persistent reminder feature,

auto-backup, a snooze function and links to portable personal organizers. Available in Single & Multiuser versions for use either as a stand alone or on a LAN. Multi-User runs on all Mac networks. Single User & Multi-User versions are System 6 & 7 compatible. Use the time management and productivity program that went into space on the Atlantis & Discovery.

Publisher: JAM Software USA Single User DAC0032

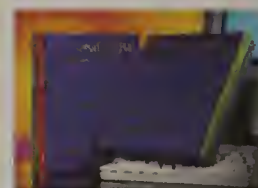
\$64

Versa Term Pro 3.6 or Versa Term 4.6

Versa Term Pro 3.6 and Versa Term 4.6 emulate the following terminals: DEC VT220 and VT100, DG D210 and D211, plus Tektronix 4014 and (with Pro only) Tektronix 4105. They Support the Apple Comm Toolbox, and come with a complete set of tools and INITs: MacTCP (TCP/IP), Telnet and FTP tools, LAT (DEC VMS Ethernet), ADSP

(Apple Talk Data Stream Protocol), plus serial and modem tools. File transfer capability includes: FTP (Client and Server), XModem, YModem, and Kermit. **Publisher: Synergy Software Versa Term 4.6 COM0002 \$90. Versa Term Pro 3.6 COM0003**

\$177



Universal PowerCache

Get 100% compatibility with 33, 40, 50 MHz PowerCache. Rated best accelerator and superior to 68040 upgrades by MacWEEK and MacUser magazines! The universal design makes it easily transportable to almost every Mac including the SE/30, II, IIfx, IIfx, LC, IIsi, and IICI. Guaranteed 100% compatible. An optional math chip is a real time-saver for spreadsheet recals and scientific tasks. "If you're looking for a way to boost the speed of your Mac, the PowerCache is the best way to do so and stay productive". *MacWeek 12/17/91*. "Because its a 68030 based card, the PowerCache will not suffer from the software-compatibility problems that plague 68040 based machines." *MacUser 12/91*. **1991 MacUser Editor's Choice Award Manufacturer: DayStar Digital See line listings for prices. PowerCache 40MHz w/882**



\$1199

Spectre

Now, one of the hottest 3D simulation action games is available for your Macintosh computer. Provides advanced simulation technology featuring dazzling color graphics. Landscapes and scenery are ominously rendered, bursting across your screen in brilliant animation. Features include optimized graphics for 256 color, gray scale and monochrome displays, ominous night combat, hazy skies and light source shading, and high quality digitized sound. Provides full multi-player networking over standard Appletalk networks so single users can go at it together (no server is required). Lan Paks, featuring 3 nodes, are available. **Publisher: Velocity Development™ ENT0409**



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MacPrint 1.3



Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIIs and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript. Cable is included. **Publisher: Insight Development UT10098**

\$95



HayesConnect™ Version 3.0

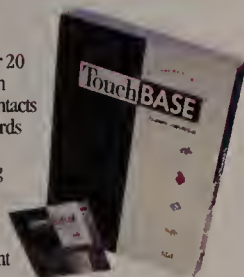
Turn your modems, printers, plotters, and other serial devices into shared resources on your AppleTalk network. HayesConnect is the software solution that expands the usefulness of your peripherals by enabling you to share a wide variety of serial devices connected to Macintosh® computers on any AppleTalk® network. Sharing resources on your network gives you greater versatility, convenience, and cost control. For example, HayesConnect allows you to share the use of high-speed modems among many network users. No need to buy modems and phone lines for everyone; simply use HayesConnect to pool a few modems for the use of everyone in your group.

Manufacturer: Hayes COM0095

\$89

TouchBASE 2.0

TouchBASE 2.0 contains over 20 new features. Stores information about personal and business contacts and automatically capitalizes words and formats phone numbers. TouchBASE has fields for storing alternative phone numbers, and you can customize the fields. It searches through a single field, or combination, using convenient functions such as "Starts With," "Exact Match" and "Contains," plus "And" and "Or" functions. It prints envelopes and mailing labels, including postal bar codes. Dials the phone, exchanges data with other applications, and shares data over a network. **Publisher: After Hours Software DAT0076**



\$79

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Create job-winning résumés quickly with RésuméExpert. Ten editions available by profession. Each edition features 40+ professionally written and fully-formatted Microsoft Word résumé templates. Simple to use—just select a template and substitute your personal information. MacUser 10/89 awarded RésuméExpert 4 mice and raved about its "excellent" manual and writing tips. Also rated a top 200 software program by MacUser 12/89. Requires MS Word. System 7 compatible. **Publisher: A Lasting Impression BUS0087**



\$49ea.



AutoDoubler

AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's 100% compatible with all applications, desk accessories, and system extensions. **UTI0254 \$49.**

DiskDoubler 3.7

DiskDoubler gives you total control of file compression—archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, convenience, and control. System 7 Savvy! **Publisher: Sallent UT10179**

\$49



FileGuard 2.7

"It's sleek, fast, and safe. I highly recommend it." MacUser April 1991. Protect your Hard Drives and Partitions from unauthorized access (including security bypass with a system diskette), copying and erasure; Applications and File/Folders (including system folder) from unauthorized access, deletion, and/or illegal copying; Desktop (including system folder) from alterations by unauthorized users; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. System 7 compatible. **Publisher: ASD Software Office 5-Pack UT10130 \$489. Office 10-Pack UT10131 \$799. Single UT10135**

\$139

Design Your Own Home:



from top-view perspective. Sample plans included.

Publisher: Abracadata

\$65ea.

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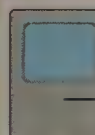
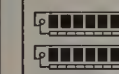



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	 1MB SURFACE MOUNT	 ADD A 1MB EXPANSION CARD	 ADD A 1MB CARD & 256K SIMMS	 ADD A 1MB CARD & 256K SIMMS  OR ADD A 3MB EXPANSION CARD
MACINTOSH CLASSIC				









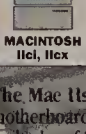
The Mac Classic comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Additional memory for your Mac Classic is provided by an Expansion Board, which slides into a slot on the Classic's motherboard. The Expansion Board can be purchased with 1MB of memory (for a total of 2MB), and then two 1MB SIMMs can be added to the Expansion Board later for a total of 4MB. Or, you can install a 3MB Expansion Board, which brings your Mac Classic up to its full 4MB. **CHP0050 1MB Expansion Board.....\$79** **CHP0051 3MB Expansion Board.....\$179**

	STANDARD	FOR 2MB	FOR 2.5MB	FOR 4MB
	 4-256K SIMMS	 ADD 2-1MB SIMMS	 ADD 2-1MB SIMMS & 256K SIMMS	 ADD 4-1MB SIMMS
MACINTOSH PLUS & SE				

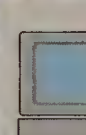




The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs modules - totalling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs. Replace two 256K modules and you will have a total of 2.5MB of memory. (That's the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you'll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)

	STANDARD	FOR 4MB	FOR 6MB	FOR 10MB
	 2MB SURFACE MOUNT	 ADD 2-1MB SIMMS	 ADD 2-2MB SIMMS	 ADD 2-4MB SIMMS
MACINTOSH LC				

The Mac SE/30, II, IIx, IIcx, and IIfx each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1 MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4, 5 or 8MB on the II and IIx, and up to 32MB on the SE/30, IIcx and IIfx, depending on whether you are using 1MB, 2MB or 4MB SIMMs. If you are upgrading a Mac IIfx, you must use SIMMs rated at 80ns or faster.

	STANDARD	FOR 4MB	FOR 5MB	FOR 8MB	FOR 9MB (IIfx only)	FOR 16MB (IIfx only)	FOR 32MB
	 4-256K SIMMS	 ADD 4-1MB SIMMS	 ADD 4-1MB SIMMS & 256K SIMMS	 ADD 4-1MB SIMMS & 256K SIMMS	 ADD 4-2MB SIMMS & 256K SIMMS	 ADD 4-2MB SIMMS & 256K SIMMS	 ADD 4-4MB SIMMS
							
							

The Mac IIfx comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Four slots are available for additional memory, and you must upgrade your Mac IIfx in multiples of four. The Mac IIfx is expandable to 5, 9 or 17MB, depending on whether you are using 1, 2 or 4MB SIMMs, and the SIMMs modules must be rated at 100ns or faster.

	STANDARD	FOR 5MB	FOR 9MB	FOR 17MB
	 1MB SURFACE MOUNT	 ADD 4-1MB SIMMS	 ADD 4-2MB SIMMS	 ADD 4-4MB SIMMS
MACINTOSH IIfx				

The Mac LC comes with a standard 2MB of memory, surface mounted (soldered) to the motherboard, with two slots available for additional memory. The Mac LC can be upgraded to 4, 6, or 10 MB, depending on whether you are installing 1, 2 or 4MB SIMMs.

CHP0012	1MB	SIMMS - 120ns	.....	\$49
CHP0013	1MB	SIMMS - 100ns	.....	\$55
CHP0022	1MB	SIMMS - 80ns	.....	\$59
CHP0008	1MB	SIMMS - 70ns	.....	\$69
CHP0042	2MB	SIMMS - 80ns	.....	\$109
CHP0011	4MB	SIMMS - 80ns	.....	\$199

FREE STEP-BY-STEP VIDEO INSTRUCTIONS** Ask for item #AAA0004 and receive our Free* video when you purchase two or more SIMMs modules.

MWD2P

Circle 270 on reader service card

Mac WAREHOUSE

Color Printer Progress

NEW TECHNOLOGIES ARE

MAKING COLOR OUTPUT BETTER THAN EVER

E*ven in the fast-moving world of Macintosh peripherals, the recent proliferation of color printers has been considered extraordinary. In the last year,*

the number of color printers for the Mac has more than tripled, making for complicated buying decisions but many good options for consumers. From the under-\$1000 ink-jet printers to near-photographic-quality machines that sell for more than most two-bedroom homes, quality is improving, and as production ramps up, prices are beginning to spiral downward.

Color printing from the Mac used to mean dealing with unreliable software drivers and arcane hardware connections that revealed the printer's origins on the PC platform. These problems are now mostly in the past. New technologies, such as PostScript Level 2 and new color-calibration schemes, promise to finally make high-quality color printing easy and predictable for the average user.

There are many reasons to print in color. For business presentations, a spot of color adds spice to documents or overhead transparencies. Desktop publishers need

to produce comps—previews of color images for client approval. Color output can make technical diagrams, such as circuit layouts, more informative. And as digitized video becomes just another type of computer data, there will be a growing need to print individual video frames for reference or manuals.

These tasks can be tackled with a variety of technologies. Ink-jet, thermal-wax, and dye-sublimation technologies are nothing new, while solid-wax phase-change and color-laser methods are just beginning to make their marks (see "Gamut Variations"). (For a primer on the applications, challenges, and technologies of color output, see *Getting Started* in this issue.) But which printer and technology offers results that best suit your needs and budget?

A Spray of Color

INK-JET PRINTERS OPERATE BY DRAWING cyan (C), yellow (Y), magenta (M), and

sometimes black (K) ink into the print head, where small heating elements cause the ink to boil. The boiling ink forms a bubble, which expands, forcing a droplet of ink through a nozzle and onto the paper.

The key to understanding ink-jet printers is to know their limitations. With the exception of Iris Graphics' Iris Smart-Jet Series 4012, ink-jet printers work best for spot color in presentations, in-house documents, and overhead transparencies. But for complex graphics, particularly scanned images, ink-jet technology is only good for rough drafts. The details these printers produce are not sharp enough, and the colors are not well blended enough to produce the smooth, clear transitions and subtleties that make a high-quality print.

At prices ranging from \$995 for Hewlett-Packard's HP PaintWriter Printer and \$1095 for the HP DeskWriter C Printer to \$2595 for the HP PaintWriter XL Printer, and carrying an average cost of only 66 cents a page, ink jets are economical. They have resolutions of between 160 and 216 dots per inch, with the exception of the 300-dpi HP DeskWriter C Printer and two 300-dpi printers from Iris. (By the time you read this, however, the 360-dpi, \$2995 Canon BJC-820 should be shipping).

For best results, most ink jets need special coated paper that is less absorbent



From top to bottom, the Tektronix Phaser II PXi, the NEC Colormate PS80, and the Hewlett Packard HP DeskWriter C.



Canon USA Color Laser Copier 500



Eastman Kodak XL 7700



Tektronix Phaser III PXi Color Printer



Panasonic Communications & Systems EPL-8543



QMS ColorScript 100 Model 10



NEC Technologies Colormate PS80

than plain paper; plain paper allows the ink to spread out before it dries, resulting in a fuzzy image. The HP DeskWriter C uses an innovative ink that spreads less on plain paper.

Ink jets produce prints with a dull finish, unlike the bright thermal-wax output. None of the ink-jet printers (again, except the Iris machines) include PostScript, so you'll want to use Adobe Type Manager (ATM), TrueType fonts, or a PostScript emulator to get smooth text at any size.

Hewlett-Packard makes a good line of ink jets. Among these, the \$1095 DeskWriter C stands out. In a convenient and innovative feature, this printer can switch between a black-ink cartridge (for true black text for correspondence) and a three-color (C, Y, M) cartridge. Prints from the DeskWriter C had a delicacy

that the other ink jets lacked, probably because of its higher resolution. And among ink jets, only the DeskWriter C and PaintWriter XL can be shared over a LocalTalk network. The PaintWriter, which has been around for a couple of years, seems to have been passed by the higher-quality and more versatile DeskWriter C, which costs only \$100 more. The PaintWriter XL, however, handles tabloid-size paper and prints more than twice as quickly as the DeskWriter C—which placed dead last among QuickDraw printers in speed tests (see "Printer Speed").

The Tektronix ColorQuick does live up to its speedy name; it is the only ink-jet printer beside the Iris SmartJet to hook up via the SCSI port. Since the SCSI port can transfer data much faster than can a

serial or LocalTalk connection, the ColorQuick was the fastest QuickDraw printer in our tests. Its images are uniformly too dark, however.

Canon USA has announced a new unit that should be shipping when you read this. Called the BJC-820, it's a QuickDraw ink jet that has a resolution of 360 dpi and prints on paper as large as tabloid size. It connects to the Mac via the SCSI port, and is slated to be priced under \$3000.

Macworld Lab did a fade test of representative output samples, exposing the prints to ultraviolet light to simulate the long-term effects of sunlight. The ink-jet and phase-change output faded dramatically. After 200 hours of exposure, for example, most DeskWriter C colors did not remotely resemble the originals. Don't se-



Hewlett-Packard HP DeskWriter C Printer



Iris Graphics SmartJet 4012



Original



Tektronix ColorQuick for the Macintosh



Kodak Diconix Color 4

Images from Five Technologies Detail and texture quality varies widely across technologies, as seen in comparison with the original image (top right). The other samples on this page were produced by ink jets, with the Iris SmartJet in a class by itself. The three thermal-wax samples (opposite page, bottom row) show smoother transitions between colors and sharper details than most ink jets can manage. The Tektronix solid-wax entry (opposite page, top right) shows the speckled look of an ink jet with the relatively smooth color transitions seen in thermal wax output. Canon's color-laser technology and Kodak's dye-sublimation method (opposite page, top left and top center) come closest to the quality of the Iris.

lect any of these machines for documents that will have frequent use over a long shelf life, or for handbills or posters. In contrast, thermal-wax and color-laser prints did not fade, and the dye-sublimation print faded only slightly.

Connect the Dot Matrix

IF YOU CAN'T AFFORD A DEDICATED color printer but have an ImageWriter II, you can still print in color, albeit in a limited way. Although Macworld Lab did not test the color ImageWriter II option, Apple and most mail-order vendors offer a continuous-loop four-color ribbon suitable for printing simple color images. But finding applications that can take advantage of the ImageWriter II's color capabilities can be difficult. Some older applications, such as SuperPaint 2.0, MacDraw

II, and Print Shop, can print up to eight colors with the ImageWriter, but many newer programs cannot. Microspot USA has stepped in with a \$69 alternative ImageWriter driver, called MacPalette II, that lets most applications print in color. Even with appropriate software the continuous-loop ribbon doesn't last long. After the first time through, colors begin to look muddy and indistinct. Still, you can use the ImageWriter II for some in-house presentations and for simple color comps, and kids may have fun using it with some painting and banner-making packages.

Hot Wax

THERMAL-WAX PRINTERS CREATE SHINY, richly colored prints on glossy paper. Inside the printer, the ribbon has consecutive, page-size areas of cyan, yellow,

magenta, and in some cases black wax. As the paper passes under the ribbon, heating elements in the print head melt dots of wax onto the paper. Because the paper is drawn back into the printer for each color, the quality of registration depends on the printer's paper-handling accuracy. If the printer's registration is off, the quality of black suffers. This generally makes thermal-wax printers an inappropriate choice for producing black type. Even where registration is accurate, the three primary colors usually produce a dark brown rather than a true black. The four-color ribbon adds a separate black component. The trade-off is that because four-color ribbons yield fewer prints, their cost per print runs are about 25 percent more expensive, and printers that use them are about 20 percent slower. When



The Tektronix Phaser III PXi

you shop for a thermal-wax printer, try it out; print some thin black lines to check for good color registration, and print solid-black areas to test the printer's version of black—you may find a three-color ribbon adequate for your needs.

At prices ranging from under \$5000 to \$18,300, thermal-wax printers hold the middle of the color-printer market—expensive enough for most of them to include PostScript interpreters, yet afford-

able for most design shops. With bright colors and in most cases 300-dpi resolution, they also provide adequate-to-very-good-quality color comps and proofs at a bargain price—about 50 cents a page. Thermal-wax printers are also the best choice for overhead transparencies. Ink jets apply ink in rounded dots that act as tiny lenses, subtly breaking up light and muddying the image. Thermal-wax printers, however, apply smooth, even sheets of color that minimize the lens effect.

Thermal-wax printers boast the most shipping products, many more than we actually tested, so your range of choices here is quite wide (see "Color Printers Galore"). Despite being a QuickDraw unit, the Panasonic EPL-8543 printed our test files with natural-looking color and small, subtle dither patterns—the configuration of dots that make up the image (see "Dither Pattern Influence"). Good marks also go to the Tektronix Phaser II PXi Color Printer, the QMS ColorScript 100 Model 30i, and the NEC Colormate PS80. All of these produced finely detailed prints with rich, natural colors.

Thermal-wax printers to stay away from include the Tektronix Phaser II PX (don't mistake this one for the Phaser II

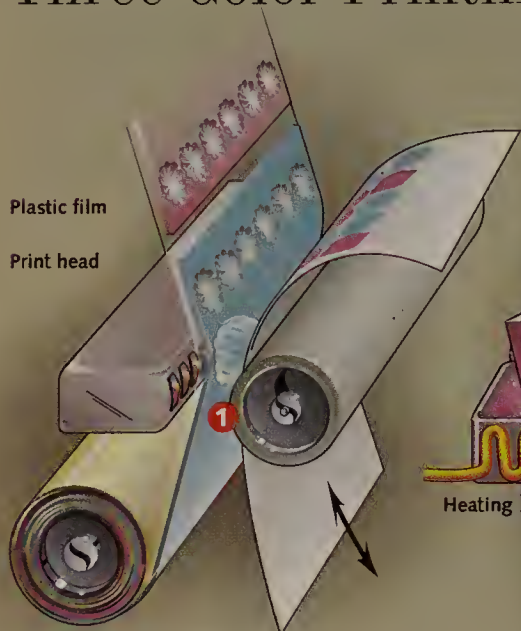
PXi) and the Linotype-Hell Color Printer 30. Those printers were the slowest PostScript units we tested, and the Linotype-Hell machine uses an obvious dither pattern, with a large cell size.

Phase to Phase

THE \$9995 TEKTRONIX PHASER III PXi Color Printer is the first Macintosh printer that uses the new, phase-change ink-jet technology. In this scheme, four wax-ink sticks (C, Y, M, K) are loaded into the printer. The sticks are like hard crayons; you can even write on paper with them. The printer melts the sticks, then emits the liquid in the fashion of a typical ink-jet printer.

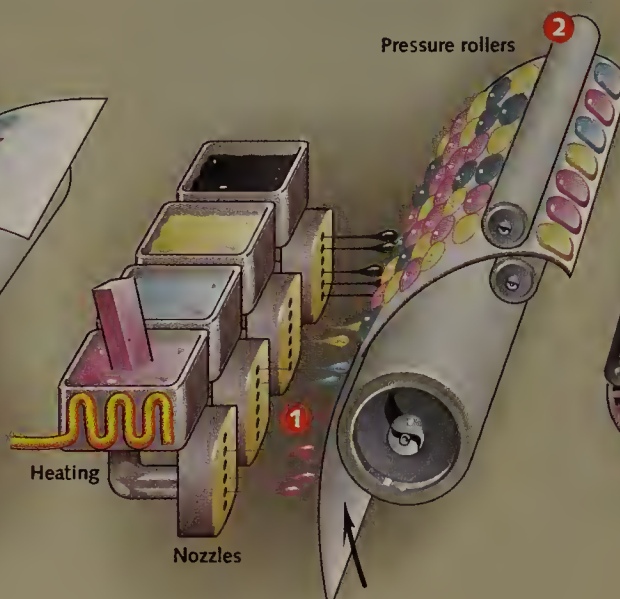
In contrast to the coated stock used by thermal-wax printers, the Phaser III PXi prints on plain paper, and its prints have a matte finish. One terrific feature of this printer is that it handles paper as large as 12 inches by 18 inches, so artists can use this machine for full-size 11-by-17-inch bleeds. This feature also makes the III PXi a logical candidate for engineering drawings and architectural renderings (although its tendency to fade in sunlight doesn't make it a great choice for posters and signs). Cost per letter-size page is

Three Color Printing Technologies



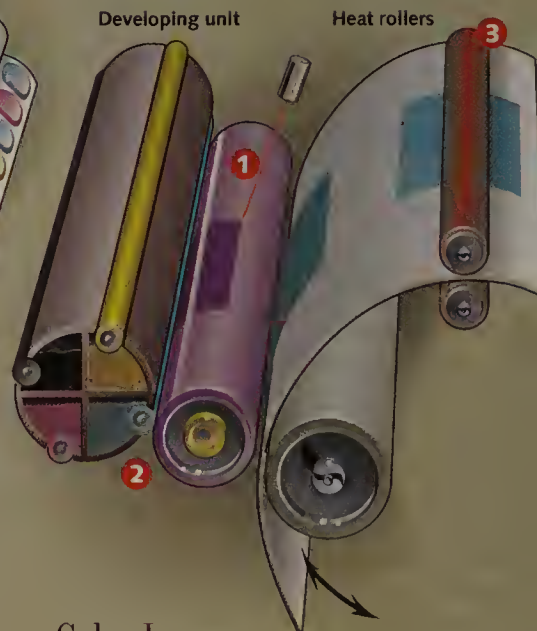
Dye Sublimation

Dye-sublimation printers pass plastic film coated with cyan, magenta, yellow, and black (C, M, Y, and K) dye across a print head containing about 2400 heating elements. This dye goes from solid to gaseous form when heated (1). Coated paper, designed to absorb the gaseous dye on contact, passes across the film four times (once per color) as it contacts the print head. Each heating element can produce 255 different temperatures—the hotter, the more dye is transferred. This variable dye density produces continuous-tone images.



Phase Change

Phase-change printers melt blocks of C-, M-, Y-, and K-color wax in ink reservoirs. The melted ink is sprayed onto the page through tiny perforations in print-head nozzles (1), in a single pass, as with typical ink-jet printers. Unlike the water-based inks used in typical ink jets, the wax-based inks in solid-ink printers solidify on the page very quickly, inhibiting absorption that can reduce image sharpness. This allows solid-ink printers to use relatively absorbent plain paper. High-pressure rollers then flatten the dots and fuse them to the page (2).



Color Laser

Color laser printers use a four-chamber developing unit that holds colored (C, M, Y, and K) plastic toner powder. After a light source exposes an image on a photosensitive drum (1), exposed portions of the drum take on an electrical charge that attracts toner as the drum rotates past the developing unit (2). This process is repeated four times, once for each color. After each exposure, the paper passes across the toner-coated drum. When the four passes are completed, heated rollers fuse the toner to the page (3).

about 25 cents, better than any of the thermal-wax units.

The Phaser III PXi is a good choice for color comps and presentation graphics. Images from the Phaser III PXi on paper and transparencies show vivid colors and sharp details, and because all colors are printed in one pass, registration is excellent. Its dither patterns are small and subtle. Most of the images we printed ended up looking a bit too warm, however, favoring the reds in the image. Correspondingly, the printer's gamut (range of colors that a device can produce) shows one of the largest red-magenta ranges among the printers we tested.

The Phaser III PXi's controller is built around an AMD 29000 RISC processor, running PostScript Level 2. In our speed tests, it ran in the middle of all of the PostScript printers and produced output that ranks with the best of the thermal-wax printers.

Tektronix was the first to come to market with this technology, but by the time you read this there will be at least one other phase-change ink-jet printer available, the \$6995 Jolt PS by Data-products. The Jolt PS will use an Adobe Level 2 PostScript controller and print letter and legal (but not tabloid) paper sizes. Brother also plans to introduce its HS1PS, a solid-wax unit that will sell for under \$10,000, later this year.

Dye-Sublimation Options

DYE SUBLIMATION IS A TECHNOLOGICAL cousin of thermal wax. Both use ribbons with consecutive blocks of colors, but with dye sublimation the ribbon is impregnated with dyes instead of waxes. Where thermal wax melts an entire dot of pigment onto the paper, a dye-sublimation print head heats the dye until it vaporizes; the vapor then congeals on the paper. By varying the print head's heat, the printer modulates the amount of dye

vaporized, thereby controlling the density of the resulting dot on the paper. By mixing the densities of cyan, yellow, and magenta on the paper, dye-sublimation printers can produce continuous-tone images with smooth transitions from one color to the next.

The \$19,995 Kodak XL 7700 is the only dye-sublimation printer that we tested this year; several other companies offer dye-sublimation machines, but they were unable to provide evaluation units (see "Color Printers Galore"). The XL 7700 is a QuickDraw device, so to get smooth images from PostScript draw programs such as Aldus FreeHand and Adobe Illustrator, you need the \$1495 Freedom of Press Professional from Custom Applications. The dye-sublimation process creates output that is rich, smooth, and detailed, with beautiful colors. Output from the XL 7700 doesn't look like it came from a computer printer—or cost like it; letter-size prints on coated paper run about \$5 each. An improvement over last year is the XL 7700's new SCSI interface and Chooser-level printer driver. We're still waiting for the promised PostScript Level 2 interpreter. The Kodak XLT 7720, which users A, A4, and 11-by-11-inch paper, should be shipping this spring, and will be followed by the Shinko CHC-S446i ColorStream/DS from Mitsubishi International.

RasterOps started shipping dye-sublimation units after our testing deadline. The RasterOps CorrectPrint 300 is a 300-dpi printer based on a Sharp engine. It uses a PostScript-clone interpreter (the RIPS Interpreter from RIPS) and can produce continuous-tone letter-size and legal-size pages. The most impressive feature of the CorrectPrint 300 is its low price for a dye-sublimation printer: \$10,999, with required RAM adding about another \$1000.

Sony recently began to offer a new dye-sublimation printer, the UP-D7000, a continuous-tone, QuickDraw printer that connects to the SCSI port. The UP-D7000 includes a Chooser-level printer driver and a plug-in output module for Adobe Photoshop. The \$11,995 UP-D7000 prints 9-by-8-inch images on A4 paper at a rated resolution of 163 dpi. Sony says the UP-



File Format Choices The file format—TIF or PostScript—used to save an image can dramatically affect output quality. These two examples show the superiority of PostScript (bottom) for the Iris SmartJet. You should print the same image from each format to determine the best format for a given printer.

D7000 produces a full-size print in about two minutes.

PostScript: The Second Coming

TWO OF THE PRINTERS WE TESTED, Tektronix's Phaser II PXi and Phaser III PXi, already use controllers with Adobe PostScript Level 2 interpreters. Level 2 is an enhanced version of the PostScript page-description language. PostScript Level 2 provides support for the perception-based CIE XYZ color space, a mathematical map of all visible colors; better color halftoning; and better printer-specific features, such as *color matching*, the conversion of color values on screen to colors that the printer can produce, and *characterization*—the determination of the gamut (see "Gamut Variations").

All of these improvements are efforts to create device-independent color management (see "All about Color," *Macworld*, January 1992). In theory, device-independent color would permit you to print the same PostScript file on any PostScript Level 2 printer, regardless of manufacturer, and get consistent color.

The impact of PostScript Level 2 will be more apparent after Apple and Adobe complete printer drivers that take full advantage of the Level 2 features—such as built-in ATM font rendering, form caching to speed repetitive printing tasks, and print-data compression—but those drivers aren't expected until late spring, at the earliest. Once they become available, we'll see increased speed for all PostScript devices, not just Level 2 color printers, and



The Kodak XL 7700 (left) and the Hewlett-Packard PaintWriter XL.



Printer Speed

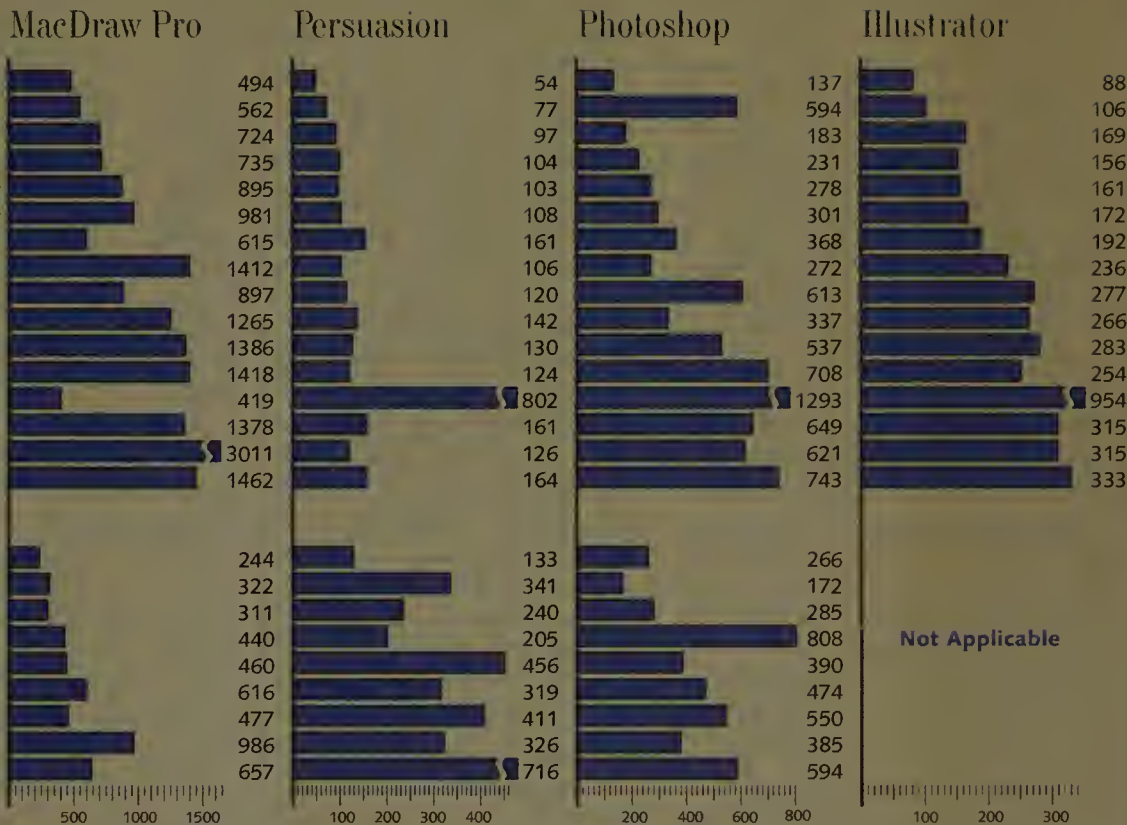
Times are in seconds.

PostScript Printers

Canon USA Color Laser Copier 500	494
Tektronix Phaser II Pxi Color Printer	562
Seiko CH5514-CP	724
Seiko ColorPoint PS	735
General Parametrics Spectra Star 440	895
General Parametrics Spectra Star 430	981
Tektronix Phaser III Pxi Color Printer	615
NEC Technologies Colormate PS80	1412
QMS ColorScript 100 Model 10	897
Seiko Personal ColorPoint PS	1265
CalComp Color Master Plus	1386
Océ Graphics G5241-PS	1418
Iris Graphics Iris SmartJet 4012	419
QMS ColorScript 100 Model 30i	1378
Tektronix Phaser II PX Color	3011
Linotype-Hell Color Printer 30	1462

QuickDraw Printers

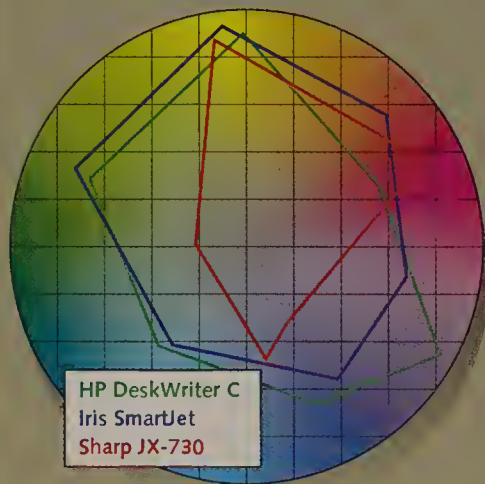
Tektronix ColorQuick	244
Hewlett-Packard HP PaintWriter XL	322
Sharp JX-730	311
Mitsubishi G650	440
Hewlett-Packard HP PaintJet XL	460
Panasonic EPL-8543	616
Eastman Kodak Diconix Color 4	477
Eastman Kodak XL 7700	986
Hewlett-Packard HP DeskWriter C	657



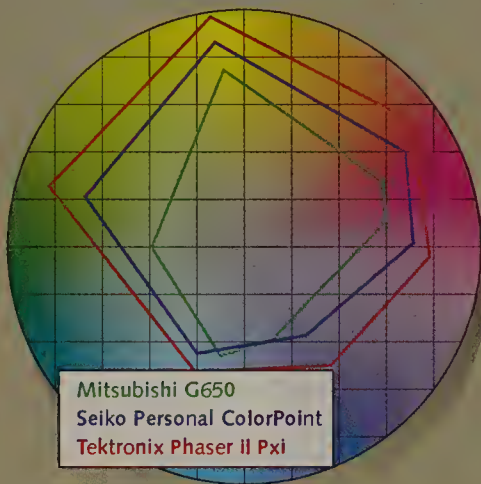
The tests were weighted equally to produce overall printer rankings within PostScript and QuickDraw categories, with the fastest at the top. We printed a complex object-oriented MacDraw Pro image, a Persuasion transparency, a Photoshop image taken from a photograph that was scanned at 150 dots per inch, and an Adobe Illustrator document (for PostScript printers only). We tested all printers under System 7, except the Iris SmartJet, which we tested under System 6.0.7 because it was not yet System 7-compatible.

Gamut Variations

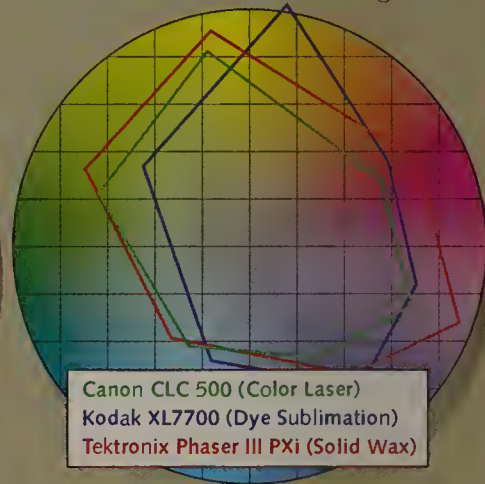
Ink-Jet Printers



Thermal-Wax Printers



Three Different Technologies



Color gamut plots show the range of colors that each printer can reproduce. A broad gamut gives the potential for reproducing a wide range of images, one of several factors that contribute to image quality. The size of a gamut bears little relationship to a printer's price. As seen in the comparison of three ink-jet printers (left), the \$49,000 Iris SmartJet ink-jet printer, which produces photographic-quality prints, has a smaller blue/cyan range than the \$1095 HP DeskWriter C.

Among thermal-wax units, the Mitsubishi G650's restricted range (center)

is sure to frustrate users who print scanned images. Some printers offer a broad selection of some colors, and a narrow range of others.

The dye-sublimation printer is very strong in yellow, but relatively weak in shades of green compared with the color-laser and solid-wax printers we tested (right).

We produced data for the gamut polygons by printing test sheets with fully saturated cyan, magenta, yellow, red, green, and blue blocks, then measuring the color values of each block with a Minolta spectrophotometer.

Video Printing

Video interface printers take the common denominator of computer images—the RGB video signal used by the display—and use it to drive the print engine directly. You simply hook the printer's adapter to the video board, then plug the Mac monitor into the adapter. Printer drivers are unnecessary—simply press the Print button on the printer when you want a hard copy of what's on your screen. Because RGB video is the standard, video printers work with virtually every device that has a video screen, making them an attractive tool for anyone who frequently needs prints from videotape, or for medical imaging of ultrasound and CAT scans.

The chief advantage of video printers is speed. They take only a second or two to capture the video signal, and those with a thermal-wax engine yield a print in about two minutes. But the video interface approach suffers from several disadvantages. Although print engines can handle images of up to 300-dpi, their output reflects the lower resolution of the video signal. Because these devices dump the whole screen image to the printer, the menu bar appears in the printouts.

And since you can't take advantage of PostScript, video printer output can have a jaggy look. Seiko Instruments bucks this trend with its thermal-wax-based Personal Colorpoint line, which starts at \$4898. The video interface can coexist with a separate PostScript interface, effectively giving the Personal Colorpoint a fast video-draft mode and a slower, high-quality PostScript mode for final output. Seiko also sells a dye-sublimation printer, the \$19,999 Professional Colorpoint, which takes about four minutes per page, but has no PostScript option. Toyo Spectrum offers a thermal-wax option, the TPG-4300, a \$10,500 unit that prints up to B-size; Panasonic Communications & Systems has a thermal-wax printer, the EPL-8541 for \$8995. Tektronix offers two thermal-wax units—the RGBIIB and RGBIII, which cost up to \$8695. And Sony has just released the UP-7000, a dye-sublimation printer that sells for only \$8995.

the drivers will take full advantage of the improved Level 2 color halftoning. But ultimately, the value of PostScript Level 2 will depend on how quickly and completely its features are implemented by software developers.

The Clone Route

FOR A VARIETY OF REASONS, SOME printer manufacturers use clones of Adobe PostScript. Tektronix developed its TekColor clone in order to improve on PostScript Level 1's color handling; some of Tektronix's technology was eventually cross-licensed to Adobe to be used as part of PostScript Level 2. And by going with a PostScript clone, the manufacturers can lower the price of their printers. Seiko is following this strategy with the \$4995 Personal Colorpoint PS, a thermal-wax printer that uses PhoenixPage, a PostScript-compatible interpreter from Phoenix Technologies that is also used by the CalComp Color Master Plus. Phoenix Technologies recently announced that it would release a PostScript Level 2 clone this spring.

The question for any clone: How compatible is compatible? Most PostScript clones handle routine text and graphics tasks well. If there are incompatibility snags, they generally relate to the trouble many clones have in printing Adobe's downloadable Type 1 fonts. Be-

cause the printers can't fully decode Adobe's instructions, small characters tend to look chunky.

The Sky Is the Limit

WHEN YOU NEED TO PRODUCE NEAR-photographic prints from your desktop, you can choose from among several high-end printers. Macworld Lab tested two of these: the Canon Color Laser Copier 500 (CLC 500), a color laser copier; and the Iris SmartJet, an ink-jet printer.

The CLC 500 is one of the few color lasers available. Doubling as a 400-dpi color copier, the CLC 500 produces plain-paper copies or transparencies in letter, legal, or 11-by-17-inch sizes. This complex and versatile behemoth (it takes up about 14 square feet of floor space) also operates as a color flatbed scanner, can scan slides, and can manipulate colors and images. To hook up to a computer, it requires an external interface—an Intelligent Processing Unit (IPU).

There are three IPU's available for the CLC 500. Canon's IPU-48 (\$7000 to \$25,000, depending on configuration) produces beautiful continuous-tone images, but it isn't PostScript capable or networkable. The \$15,000 Canon PS-IPU, a PostScript interpreter that will operate on a network, supplies only halftones. We used the PS-IPU for our lab tests, and were able to produce sharp, de-



Calibration Effects To get color output that most accurately matches the screen or an original scanned image, printers should be calibrated. This process involves measuring the range of colors a printer can produce from a standardized test pattern, and entering the measured values into software that adjusts the printer's subsequent output to conform with a standardized definition of those color values (see *Lab Notes* in this issue). But the effect is often subtle at best, as seen above. The red-orange of the airplanes, and the shading in the stamp border and underneath the wings of the calibrated output (top) is only slightly closer to the original (middle) than is the uncalibrated output (bottom).

tailed images with bright and crisp colors. Dither patterns were hardly noticeable. A third party, Electronics for Imaging (EFI), produces the Fiery, an IPU that lets the CLC 500 print continuous-tone images, and is also a fast PostScript interpreter. Ethernet and LocalTalk networking is built into the Fiery. The disadvantage of the Fiery is price; at \$35,000, it costs about 20 percent more than a configured IPU-48, and it's more than double the cost of a PS-IPU. But if you need both PostScript and continuous-tone output, the Fiery is the IPU of choice.

The CLC 500 was the fastest printer we tested, coming in first in all but the MacDraw Pro speed test. The price matches this superb performance; at \$49,000, the CLC 500 is the most expensive printer we evaluated. Buying the required IPU can boost the price to \$84,000. The CLC 500 is appropriate only for service bureaus or companies that

COLOR PRINTERS GALORE

	Product	Price ¹	Interface	Resolution (in dpi)	Adobe PostScript or Clone	Paper Sizes	Cost per A-Size Print	On-Site Service Available	Warrant
DYE SUBLIMATION									
Du Pont Printing and Publishing	4CAST Digital Color Printer	\$31,000	proprietary NuBus board	300	Adobe	A3, A4	\$5.00	yes	90 days
Eastman Kodak	Kodak XL 7700	\$19,995	GPIOB or SCSI	200	none	A	\$5.00	yes	1 year
Mitsubishi Electronics America	S340	\$13,995	P	150	none	A, Lgl	\$4.80	yes	6 months
Mitsubishi International	CHC-S445	\$23,499	LT, P	300	Pipeline PowerPage	A	\$5.00	yes	90 days
Nikon	CP-3000 Full Color Printer	\$13,595	GPIOB, P, SCSI	203	none	5" by 6"	NA	yes	1 year
Prime Option	ColorRight	\$12,995	LT, P	300	Adobe	A	\$5.50	yes	1 year
RasterOps Corporation	CorrectPrint 300	\$10,999	ET, LT, S, SCSI	300	RIPS	A, A4, Lgl	\$4.58	yes	90 days
Sony Corporation of America	UP-D7000 Color Printer	\$11,995	SCSI	163	none	A4	\$3.25	yes	1 year
INK JET									
Canon USA	FP-510 Full Color Printer	\$4995	P or S	160	none	roll	\$1.06	no	1 year
Diconix, Division of Eastman Kodak	Kodak Diconix Color 4	\$895	S	192	none	A	\$0.09	no	1 year
Hewlett-Packard	HP DeskWriter C Printer	\$1095	LT	300	none	A, A4, Env, Lgl	\$0.12	no	3 years
	HP PaintWriter XL Printer	\$2595	LT, S	180	none	A, B	\$0.19	yes	1 year
	HP PaintWriter Printer	\$995	S	180	none	A	\$0.21	yes	1 year
Iris Graphics	Iris 3024 Color Ink Jet Printer ²	\$96,750	PC	300	Adobe PS Link	24.5" x 24.5"	\$0.73	yes	90 days
	Iris SmartJet Series 4012	\$49,000	SCSI	300	Adobe Smart VIP Software	Super B	\$0.63	yes	90 days
Sharp Electronics Corporation	JX-735 Sharp Ink Jet Color Image Printer ³	\$2320- \$2394	P	180	none	A, Lgl, roll	\$0.07	no	90 days
Tektronix	ColorQuick for the Macintosh	\$2495	P, SCSI	216	none	A, B	\$0.30	yes	90 days
LASER									
Canon USA	Color Laser Copier 500 ⁴	\$56,000- \$84,000	GPIOB; ET, LT, S, SCSI	400	Adobe ⁵	A, B, Lgl	\$0.25	yes	90 days
Colorocs Corporation	CP4007	\$34,995	LT, P, S	300	RIPS	A, 8, Lgl	\$0.30	yes	90 days
PHASE-CHANGE INK JET									
Tektronix	Phaser III PXi Color Printer	\$9995	LT, P, S, SCSI	300	Adobe Level 2	A, Super B	\$0.25	yes	1 year
THERMAL WAX									
Agfa Corporation	Agfa TabScript C500	\$18,300	LT, P, S	300	Adobe	B	\$0.50	yes	90 days
Brother International Corporation	Brother HT-500PS	\$4995	LT, P, S, SCSI	300	Brother BR-Script	A, Lgl	\$0.50	yes	1 year
CalComp	ColorMaster Plus 6603PS ⁶	\$5495	LT, P, S, SCSI	300	PhoenixPage	A, A4	\$0.53	yes	1 year
General Parametrics Corporation	Spectra Star 430 ⁷	\$6995	LT, P, S	300	PowerPage	A, Lgl	\$0.46	yes	90 days
	Spectra Star 440 ⁸	\$7995	LT, P, S	300	PowerPage	A, Lgl	\$0.46	yes	90 days
Linotype-Hell	Color Printer 30	\$10,704	LT, P, S, SCSI	300	Adobe	A	could not state	yes	90 days
Mitsubishi Electronics America	G370 ⁹	\$5495	P	150	none	A, Lgl	\$0.45	yes	6 months
Mitsubishi International	CHC-445 ¹⁰	\$4500	P	300	PowerPage	A	\$0.51	yes	90 days
NEC Technologies	Colormate PS80	\$7599	LT, P, S	300	Adobe	A, A4, Lgl	\$0.67	yes	1 year
Océ Graphics	G5241-PS ¹¹	\$6990	LT, P, S, SCSI	300	Adobe	A	\$0.58	yes	90 days
Panasonic Communications & Systems	EPL-8543	\$7995	P	203	Pipeline PowerPage	A	\$0.45	no	1 year
Prime Option	ColorPage ¹²	\$4995	P	300	none	A	\$0.68	yes	1 year
QMS	ColorScript 100 Model 10 ¹³	\$8495	LT, P, S	300	Adobe	A, Super A, Lgl	\$0.54	yes	1 year
	ColorScript 100 Model 30i ¹⁴	\$10,995	LT, P, S	300	Adobe	A, B, Lgl	\$0.54	yes	90 days
RGB Technology	C88000X ¹⁵	\$7995	LT, P, S	300	PhoenixPage	B	\$0.40	yes	1 year
Seiko Instruments USA ¹⁶	ColorPoint PS Model 4 ¹⁷	\$5999	LT, P, S, SCSI	300	PhoenixPage	A, Lgl	\$0.49	yes	1 year
	ColorPoint PSX Model 4 ¹⁸	\$7999	LT, P, S, SCSI	300	PhoenixPage	A, Lgl	\$0.49	yes	1 year
	Personal ColorPoint PS	\$4999	LT, P, S, SCSI	300	PhoenixPage	A, Lgl	\$0.55	yes	1 year
Tektronix	Phaser II PX Color Printer	\$5995	LT, P, S, SCSI	300	Level 1 Compatible Tek.	A, Lgl	\$0.45	yes	1 year
	Phaser II PXi Color Printer	\$7995	LT, P, S, SCSI	300	Adobe Level 2	A, Lgl	\$0.45	yes	1 year

A = letter (8.5" x 11"); A3 = 11.7 x 16.5; A4 = 210mm x 297mm; B = tabloid (11" x 17"); Env = envelope; ET = Ether-Talk; Lgl = legal (8.5" x 14"); LT = LocalTalk; P = parallel; P/S = parallel to serial; PC = IBM PC RIP; R = RS-232C; S = serial; Super A = full-bleed letter; Super B = full-bleed tabloid.

¹ List price for base printer with required options.

² The Iris 3047 Color Ink Jet, \$123,000, uses 34" x 37" paper.

³ The JX-730, \$2120-\$2194, uses P/S interface and is gradually being replaced by the JX-735.

⁴ The CLC 300, \$22,500, has slightly lower image quality due to alternate toner; its duty cycle is half that of the CLC 500.

⁵ With appropriate IPU.

⁶ The ColorMaster Plus 6613PS, \$9995, uses A or B paper.

⁷ The Spectra Star 450, \$14,990, uses A or legal paper and can print 35mm slides.

⁸ Includes a 32MB internal hard drive for spooling and font downloading.

⁹ The G650, \$6695, uses A or B paper.

¹⁰ The CHC-745, \$8000, uses A or B paper.

¹¹ The G5242-PS, \$10,990, uses A, B, or Super B paper; the G5241-PS, \$6990, contains only 4MB of RAM.

¹² The ColorPage Plus, \$8995, uses A or B paper.

¹³ Model 10p, \$6995, uses A paper only.

¹⁴ Model 30si, \$12,995, uses A, Lgl, B, or full-bleed B paper.

¹⁵ The CB8014X, \$14,995, uses A or B paper.

¹⁶ The ColorPoint PS and Personal ColorPoint PS use 16MHz RISC processors; the ColorPoint PSX uses a 25MHz processor and includes multitasking and print-spooling abilities that the others lack. The Personal ColorPoint PS memory is expandable to 22MB; the other units are expandable to 34MB.

¹⁷ The Colorpoint PS Model 14, \$9999, uses A, Lgl, or B paper.

¹⁸ The Colorpoint PSX Model 14, \$11,799, uses A, Lgl, or B paper.

need a high volume of detailed color prints.

The Iris SmartJet uses ink-jet technology, but comparing it with the other ink jets we tested is like comparing a Rolex with a Timex. The SmartJet produces glossy-paper prints that are nearly works of art. Images show small details with great precision and are almost luminous. On high-resolution scans and other photo-realistic images, the SmartJet's prints look very much like good-quality color photographs. On computer-generated images, the SmartJet produces very sharp, pure colors. This continuous-tone printer's specifications read that it achieves a resolution of only 300 dpi, but because of the variable dot sizes used, the SmartJet is capable of perceived resolution on the order of 1500 dpi to 1800 dpi.

The Iris SmartJet goes through a 10-minute diagnostic routine when you turn it on, and it requires a 15-minute calibration and maintenance cycle every two or three days. It uses only 12-by-18-inch sheets of glossy paper, which for many uses requires you to go to the inconvenience of cutting down the print. On the other hand, the SmartJet can print two letter-size images on one sheet, or one full-bleed tabloid-size image.

The \$49,000 SmartJet connects to the Mac via a SCSI interface, and also requires a \$10,000 PostScript interpreter.

This software isn't among the world's most straightforward, but with some practice you can tame it. But be advised—this printer was the only one we tested that did not yet operate under System 7.

Partly because PostScript is in software, and partly because Iris Graphics' ink-jet technology is optimized for quality rather than speed, the Iris SmartJet ranked near the bottom in our speed tests. But who cares? This printer is not for volume production of color prints. For color proofing, it is the best we saw. You can squeeze a bit more speed out of the SmartJet by using a Mac IIx; our speed tests were done on a Mac IIfx. Iris is planning to produce a Chooser-selectable, networked hardware RIP/print spooler for all Iris printers; this will sell for between \$25,000 and \$30,000, and should ship by the second quarter of 1992.

Taking the Plunge

FOR OCCASIONAL COLOR OUTPUT, where you want a splash of color to liven up your documents, or for light-duty business presentations, an ink jet is the technology of choice. My pick: The \$1095 Hewlett-Packard HP DeskWriter C Printer, with its superior image quality, 300-dpi resolution, and low cost (the printer is the least expensive we tested, and its cost per page is only 12 cents—by far the lowest in our survey), it edges out its corporate sibling, the faster HP PaintWriter XL Printer.

Picking a winner in the thermal-wax category was the toughest call because image quality varied less than among the ink jets. That said, my pick for the best of the bunch is Tektronix's \$7995 Phaser II PXi Color Printer. The fastest performance among the thermal-wax printers put it over the top. I also recommend NEC's \$7599 Colormate PS80 for its great-looking prints. The \$9995 Tektronix Phaser III PXi Color Printer, the only phase-change ink jet shipping in the Mac market at press time, is also a worthy alternative to a thermal-wax unit.

Two competitively priced dye-sublimation printers from RasterOps and Seiko entered the market just before this issue went to press. I suggest checking these carefully before opting for the Kodak XL7700 or one of the other pricey dye-sublimation units.

When price is no object, turn to two printers that give you PostScript capability and excellent output. For large-volume businesses, the Canon CLC 500 color laser copier/printer offers excellent images quickly. If you don't need speed but have the most demanding color proofing requirements, the \$49,000 Iris SmartJet will deliver the goods. Of all the printers in



Dither Pattern Influence Because thermal-wax and most ink-jet printers cannot mix colors or vary the size or intensity of the dots they produce, they rely on various dot configurations—*dither patterns*—to represent colors not present in their ink reservoirs or ribbons. Most printers offer two or three standard dither patterns, and certain software programs can expand that repertoire. Experimenting with different dither patterns can yield impressive improvements in image clarity. As shown above on output from the Seiko Personal Colorpoint, Seiko's enhanced setting (top) shows the books in Lenin's library much more clearly than do the standard Seiko setting (middle) and the Photoshop default (bottom).

this year's evaluation, the SmartJet produced the finest quality in a wide variety of applications. **m**

See *Where to Buy* under Color Printers for contact information.

Contributing editor TOM NEGRINO is a director of the Los Angeles Macintosh Group and a contributor to the *Macworld Read Me First Book* (IDG Books Worldwide, 1991).

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EDITORS' CHOICE

Ink Jet

HP DeskWriter C Printer This inexpensive machine offers excellent, 300-dpi image quality. **Company:** Hewlett-Packard. **List price:** \$1095.

Thermal Wax

Phaser II PXi Color Printer Fast performance made this printer the winner in a category with relatively little variation in image quality. **Company:** Tektronix. **List price:** \$7995.

High End

Color Laser Copier 500 (CLC 500) For high-volume jobs, this photographic-quality printer—which doubles as copier, scanner, and image processor—serves almost any range of needs. **Company:** Canon USA. **List price:** \$56,000–\$84,000, depending on configuration.

Iris SmartJet Series 4012 This machine produces comps and presentation graphics at the highest standard—featuring better image quality than any other printer we tested. **Company:** Iris Graphics. **List price:** \$49,000.

Keeping Jobs on Course

BY MIKE HECK

Thirteen project
managers to help
you stay on time
and within budget

Think of project management and you probably picture massive jobs like orchestrating the Olympics or constructing an offshore oil-drilling platform. Today, assignments of this scale would be unthinkable without elaborate project-management software. Yet everyday, managers also stand to benefit from a wave of new, moderate-cost project managers. Project managers can assist in most any endeavor where you need to work on time and within budget—everything from introducing new products to organizing a department to launching a small business.

Full-function project managers help you plan and track the allocation of time, resources, and money. Put simply, you determine what needs to be done and the proper sequence in which it must be accomplished, then assign people, equipment, or material to each job. The software calculates the plan's overall length and cost based on task duration and resource availability.

Programs in the under-\$400 range—AEC Software's FastTrack Schedule and FastTrack Resource, MacVonk's KeyPlan, Mainstay's MacSchedule Plus, and Varcon Systems' Great Gantt—are de-

signed for simple projects. The programs are most useful for creating quick presentations and planning simple projects.

Products in the midrange—Microsoft Project, Claris's MacProject II, Micro Planning International's Micro Planner Manager, Monitor Systems' Task Monitor for the Mac, and Scitor's Project Scheduler 4 for the Macintosh—all cost less than \$700. More important, they offer versatile data-entry formats, CPM (critical-path method) scheduling (where the program determines the start and finish dates for each task and highlights activities that must be finished on time to avoid delaying the entire project), resource management, and other powerful features to coordinate multiple projects, oversee many resources, and produce detailed reports.

At the high end, costing from \$1995 to \$4200, are Lucas Management System's Artemis Schedule Publisher, Micro Planning International's Micro Planner X-Pert, and Welcom Software Technology's Open Plan/Mac. High-end programs enable you to handle thousands of jobs and juggle many interrelated projects, and are designed to communicate

with mainframe project-management systems. The report writing, detailed cost analysis (often required of government contractors), and resource management of the high-end programs are superior to the same types of features offered by the midrange packages.

Low-Cost Project Managers

TO MONITOR DEFENSE PROJECTS DURING World War I, Henry Gantt devised a type of bar chart that clearly shows task durations drawn against a calendar. This popular format is the basis of the low-end programs (see "Great Gantt").

In most of these programs you start by entering task names in an outline. Next, using a tool selected from a tool palette, you draw a bar between the task's start date and finish date to indicate a task's duration. You can also designate certain points to be *milestones*, significant points in a project that have no duration. This approach has a lot of appeal. First, you have a wide choice of bar and milestone styles, and you can usually create your own designs, if desired. Second, devising a schedule is quick. For instance, if you want to overlap several steps, just stagger them on



the Gantt chart; with full-powered programs, this sometimes requires intricate data entry.

KeyPlan, the one exception to this data entry style, requires you to move tasks from the outline to a separate view where you arrange and connect the tasks manually—only then does a time line appear.

The low-end programs' Gantt chart approach has its limitations. You can indicate that one task can't start until another ends (a finish-start dependency), but more meaningful relationships are often missing. For example, there's no way to indicate that tasks start together and run in parallel. If jobs aren't linked properly and one task falls behind schedule, dates of the following activities may not be accurate.

Generally, in low-end programs the only way to highlight critical tasks or indicate how a project is proceeding is to mark bars by hand—an automatic procedure with KeyPlan and all midlevel programs. That's not to say, however, that the low-end programs are disappointing.

The products that work from an outline-based design (Great Gantt, FastTrack Schedule, and KeyPlan) all let you create subtasks on the main outline, and then hide these subtasks under the main heading. This lets you build some complexity into your planning process, but provides a relatively simple version for taking a quick look at the outline. FastTrack Schedule even lets you copy these collapsed headings between projects, for times when a common series of tasks is repeated in several projects. Great Gantt

lets you read Micro Planner Manager and Micro Planner X-Pert files, and the 4D External Kit (available from Varcon Systems) enables you to transfer live data to and from 4D relational databases.

MacSchedule Plus emphasizes cost accounting. Its spreadsheet lets you enter actual costs and personnel resources, then view a graph showing changes from planned expenditures. In this case, you could import the financial data into an accounting program for more detailed analysis. It also uses built-in calculations based on your best, worst, and most-likely task-duration estimates to determine the probability of tasks finishing on time.

KeyPlan figures the critical path for a project, calculates the amount of free time in the schedule, and groups individual resources into resource pools to efficiently

PROJECT-MANAGEMENT FEATURES						
	Low-End Project Managers					Midrange Project Managers
	FastTrack Schedule 1.5	FastTrack Resource 1.0	KeyPlan 1.07	MacSchedule Plus 1.0.5	Great Gantt 1.4	MacProject II 2.5
Company	AEC Software	AEC Software	MacVonk USA	Mainstay	Varcon Systems	Clariss Corporation
Price	\$235	\$249	\$395	\$345	\$195	\$499
CAPACITY						
Tasks per project	32,000	65,000	unlimited	unlimited	unlimited	unlimited
Resources per task	NA	65,000	6	NA	NA	8
Resource calendars	○	○	●	○	○	●
Subprojects	6	○	●	unlimited	unlimited	●
SCHEDULING AND RESOURCE CONTROL						
CPM calculations	○	○	●	○	○	●
Selective resource leveling	○	●	●	○	○	●
Manual or automatic leveling	neither	manual	manual	neither	neither	automatic
Split resource assignments	○	●	●	○	○	●
Time-limited scheduling	○	○	●	○	○	○
Resource-limited scheduling	○	○	●	○	○	●
Partial resource allocation	○	●	●	○	○	●
Lag time	○	○	●	●	○	●
Prioritizes (projects/tasks)	○/○	●/●	○/○	○/○	○/○	○/●
Task relationships	F-S	F-S	F-S	F-S	F-S shown only	F-S, S-S
PLANNING AND TRACKING CAPABILITIES						
Outliner	●	○	●	○	●	○
WBS codes	○	○	○	○	○	○
Histogram view	○	●	●	○	○	●
EDITING CAPABILITIES						
Table data entry	●	●	●	○	●	●
Search and sort filtering	○	●	●	○	●	●
Custom views/custom fields	●/●	●/●	●/●	●/●	○/●	●/○
REPORTING						
Earned value analysis	○	○	○	●	dollar progress	export to Resolve
Variance reports	○	○	●	●	○	export to Resolve
Customize symbols	●	●	●	●	●	○
Cost charting	○	○	●	●	●	export to Resolve
Chart annotation	●	○	●	●	●	●
Import and export formats	ASCII, MacProject	ASCII	Acta	ASCII	MacProj., Micro Planner, X-Pert	ASCII, DIF, Resolve, SYLK

● = yes; ○ = no. F-F = finish-finish; F-S = finish-start; S-F = start-finish; S-S = start-start. ¹ Dates and labels only.

schedule jobs. Although it offers some automatic calculations, the program requires you to manually correct resource overloads by viewing a histogram bar chart of the hours someone is assigned to a task.

AEC Software's FastTrack Schedule provides its own solution to keeping track of necessary resources—the companion FastTrack Resource program. A linked Gantt chart and histogram let you interactively change dates and see the effect on resource work loads. Furthermore, the unique Gantt-histogram combination indicates when, and on which activities, resources are working.

All these programs handle simple project-management tasks adequately. The quality of FastTrack Schedule's presentations stands out for those who need to present their information to others. If

your needs for scheduling are more extensive, Great Gantt's import capabilities make it easiest to enhance schedules from other programs, and I found its interface the easiest to understand.

KeyPlan requires some extra learning time compared with the other low-end programs. But your efforts are rewarded because the program offers above-par resource scheduling and tracking features. Although KeyPlan is a bit pricey, it can tackle larger jobs and therefore offers good value. A good alternative is to use FastTrack Schedule and Resource in combination; their total price still comes in below a middle-of-the-road product's.

Midrange Project Managers

FOR MORE-SERIOUS PLANNING, REACH for one of the mainstream, midrange pro-

grams. This group is aimed at business managers, so ease of use is emphasized, if not totally realized.

As projects grow past a few hundred tasks, simple outlining is inadequate; you need to use a work-breakdown structure (WBS) code. With these codes you might, for example, assign a number (say, 002) to all the tasks in one operation, and a suffix to all the associated subtasks (002-xxx). Thus you can clearly identify task relationships and even print out tree diagrams to see the organization of a project in top-down style.

Reporting, too, is a standout feature of the midrange products. The ability to customize the information you want to present is a valuable feature for anyone who needs to sell ideas, summarize progress, or make a good impression. And

Low-End Project Managers				High-End Project Managers		
Microsoft Project 1.1	Micro Planner Manager 1.0	Task Monitor for the Mac 4.2	Project Scheduler 4 for the Macintosh 1.0	Artemis Schedule Publisher 4.2	Micro Planner X-Pert	Open Plan/Mac
Microsoft Corporation	Micro Planning International	Monitor Systems	Scitor Corporation	Lucas Management Systems	Micro Planning International	Welcom Software Technology
\$695	\$595	\$495	\$685	\$1995	\$1995	\$4200
2000	1500	unlimited	2000	4000	10,000	unlimited
20	20	1	unlimited	254	20	250
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	○	●	●	●	●
automatic	automatic	neither	automatic	neither	automatic	automatic
●	●	○	●	●	●	●
●	●	○	○	●	●	●
●	●	○	●	●	●	●
●	●	○	●	●	●	●
●	●	●	●	●	●	●
●/●	●/●	●/●	○/○	○/●	○/●	●/●
F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S	F-F, F-S, S-F, S-S
●	●	●	●	●	●	○
●	●	●	●	●	●	●
●	●	○	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●/●	●/●	●/●	●/○	●/●	●/●	●/●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	two choices	●	●	●
●	●	●	●	●	●	●
●	●	● ¹	○	●	●	○
ASCII, CSV, Excel, MPX, Microsoft Proj. for Windows	ASCII, InstaPlan, MacProj., Micro Plan., X-Pert	Artemis, ASCII, Project/2, Vision	1-2-3, ASCII, CSV, Excel	1-2-3; Artemis 6000, 9000; ASCII; Excel	ASCII, CSV, DIF	ASCII



MAX AGUIERA-HELLWEG

At AEC-Able Engineering, President Max Benton uses Microsoft Project to monitor the 20 people and more than 200 tasks needed to design equipment for positioning solar arrays on the Space Station Freedom.

juggling resources when people, machinery, or buildings get overbooked is a task that the midrange programs excel at.

- **MACPROJECT II** A Gantt chart is limited because it can't easily depict how tasks are connected—a limitation that's overcome in a PERT chart. MacProject II uses the PERT schedule chart for constructing a project. You draw task boxes and connect them with lines that define project logic. Box size and text placement are easily varied, but you must position all tasks by hand, so maintaining a large MacProject II schedule chart can be tedious.

MacProject II delivers seven project graphs and tables by linking directly to Claris's Resolve spreadsheet, so as long as you own Resolve, you've got flexible reporting capabilities. All in all, though, despite MacProject II's popularity, other programs currently offer more-elaborate reporting and scheduling options.

- **TASK MONITOR** Task Monitor for the Mac suffers from having been transplanted from DOS and Wang computers. You complete multiple forms and tables, then generate character-based reports. While you can switch to a graphics worksheet to add or delete activities and link tasks, Task Monitor's lack of color makes it hard to distinguish critical and normal tasks.

- **MICROSOFT PROJECT AND MICRO PLANNER** Microsoft Project and Micro Planner Manager let you build and modify projects using the format you find easiest: PERT, Gantt, outline, or spreadsheet.

Microsoft Project integrates its data input, customized tables, and editing into the easiest interface to learn and use (see "Microsoft Project"). You can, for instance, group a range of tasks and link or edit them with a few mouse clicks. Moreover, any two of Project's ten standard screens work in concert.

Launching a project in Micro Planner Manager opens an inner desktop of folders for organizing reports, resources, and work calendars. Although not quite as elegantly integrated as Microsoft Project, Micro Planner Manager's multiple windows with automatic tiling produce multiple views of a project (see "Micro Planner Manager"). Unfortunately, Manager requires several extra steps to produce charts or calculate the schedule, and requires time to master.

Microsoft Project and Micro Planner Manager both include extensive scheduling functions. Plans can be computed to meet a certain deadline (time-constrained) or can be resource-driven (the length of time is determined by available resources). Microsoft Project provides eight constraint types, but you can specify only one condition at a time. Micro Planner Manager offers some unusual task attributes, including one that starts jobs at the last moment for just-in-time manufacturing.

Unfortunately, Microsoft Project 1.1 has some scheduling blemishes. For example, if you move a Gantt bar with the mouse, Microsoft Project forces an exact starting date, which may not be what you

intended. Also, when you recalculate a plan, previous leveling delays aren't removed. So if a task is completed faster than expected, the program actually reports that the job took longer than you indicated. These problems reduce the product's usefulness, since the whole point of automating project management is to let the computer do these kinds of brute calculations and help you to identify the implications of changes in your project as it progresses.

Microsoft Project provides great customization in reporting; you can arrange tables and reports, containing up to 60 fields, in any order. Microsoft Project also offers seamless file transfer to Microsoft Project for Windows. Micro Planner Manager's custom report writer can handle more than 100 elements, and lets you embellish charts with custom graphics and special text.

Micro Planner Manager's interface will tax inexperienced users, but there is little you can't accomplish with the program.

- **PROJECT SCHEDULER 4** Project Scheduler 4 for the Macintosh takes a different approach. You start scheduling by filling in a general activity form; task bars then appear on a Gantt chart, where they can be dragged to change start and end dates or task duration. You might define task dependencies using another form, or draw joining lines on the PERT display. Project Scheduler 4 automatically aligns PERT task boxes and offers other conveniences such as five zoom levels.

Project Scheduler 4 can control several variables concurrently. What's more, Project Scheduler 4's risk-analysis feature calculates the probability that a task will finish on time, based on optimistic, likely, and pessimistic estimates of task duration, to produce a more realistic schedule. Task Monitor also incorporates statistical analysis to produce optimistic, most-likely, and pessimistic schedules.

All in all, Project Scheduler 4 has an impressive feature set that includes the best implementation of interactive resource allocation; organizational and WBS codes; and cost graphs. Although its data entry and reporting are a bit rigid, its continuous rescheduling, solid resource-allocation tools, and cost controls make Project Scheduler 4 my top pick in the midrange.

High-End Project Managers

SET APART BY VIRTUALLY UNLIMITED data capacity and lofty prices, the high-end programs are most at home in big companies or those working on large projects. The high-end programs' overpowering interfaces and capabilities mean

that you need to work with the software regularly to get its maximum benefit.

Open Plan/Mac is actually a shell surrounding an unlimited data repository and requires Fox Software's Foxbase+/Mac database program (which you must purchase separately). Although menus shield you from underlying data structures, you need to sift through many forms to perform basic data entry and to schedule tasks. There's very little graphical feedback except for printed PERT charts and some financial tables.

Micro Planner X-Pert's more streamlined design helps accomplished users get

right to work. You might want to organize thoughts in a work-breakdown outline for later transfer into a formal network diagram. Like Open Plan/Mac, Micro Planner X-Pert offers an alternative arrow-diagramming method; some professional planners prefer this method to the precedent-diagramming method more commonly used in project-management software.

X-Pert lets you build and then modify PERT charts, all with a few mouse motions. Changing scheduling information and resource assignments is equally convenient using one multipurpose data entry form.

Artemis Schedule Publisher's designers understood that less is often best. You start with a full-screen Gantt display; just double-click anywhere to add a task. Each bar provides eight hot spots that you grab to change task duration or double click to reveal a task detail form.

In contrast to the other high-end products, Artemis Schedule Publisher recalculates the end date of the project whenever you make a change in the duration of a task. This eliminates the time-consuming process of manually requesting a program to recalculate the schedule and then waiting while it does so. Artemis Schedule Publisher lacks automatic resource-leveling; instead, you instantly see competing resources on a bar chart and must manually reschedule tasks or extend work hours to remove conflicts. This process isn't as arduous as it sounds because the program can recalculate the end date of your project so quickly.

Reporting is the high-end group's forte. If Schedule Publisher's standard reports are inadequate, you can construct your own layout using an object-oriented draw package such as Claris's MacDraw or Deneba's Canvas. Scheduler Publisher then merges data with your template. Likewise, Micro Planner X-Pert's built-in report generator helps you assemble tailor-made reports. You can custom arrange any number of components, including information about resources, results of time analysis, and cost summaries.

Open Plan/Mac has a confounding interface, but in the right hands its data reporting is unequalled. In essence, the process involves writing report specifications in the program's Welcom Reporting Language (WRL), which provides endless variations for data layout, sorting, and computations.

Although all the packages have some import and export capabilities, the high-end offerings are especially designed to integrate with other systems. Schedule Publisher feeds data to Artemis mainframe and minicomputer versions, making

MW

EDITORS' CHOICE

Low End

KeyPlan 1.07 The most well rounded low-end solution. Offers critical-path management and flexible project-scheduling calculations, and accommodates resource pools.

Company: MacVonk USA. **List price:** \$395.

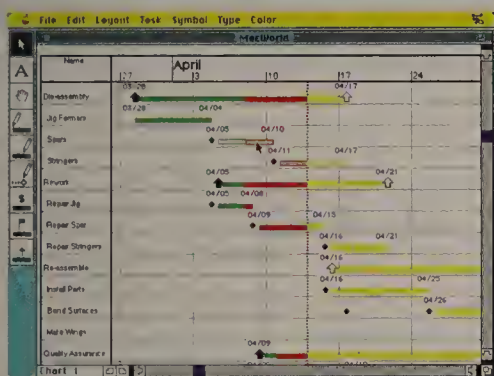
Midrange

Project Scheduler 4 for the Macintosh 1.0

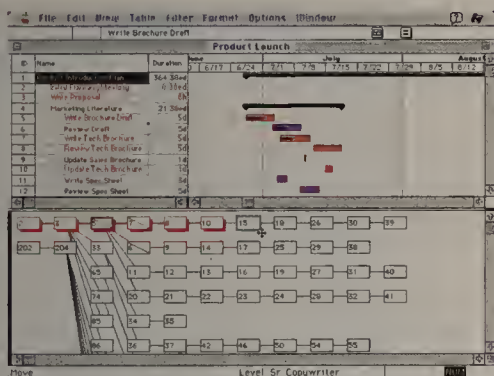
A solid midrange product with sophisticated project scheduling, reporting, resource allocation, and cost-control tools at a reasonable price. **Company:** Scitor Corporation. **List price:** \$685.

High End

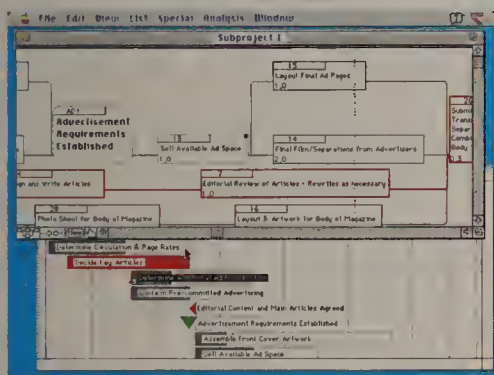
Micro Planner X-Pert 1.04 This program offers the best balance between high-end features and ease of use. It has smooth operating performance and an adaptable reporting module. **Company:** Micro Planning International. **List price:** \$1995.



Great Gantt Great Gantt has a clean toolbox, crisp graphics on an easily understood calendar, and simple operation. Beginners can use the product without project-management training.



Microsoft Project Microsoft Project lets you compare various project views, such as a Gantt time line and a PERT network diagram.



Micro Planner Manager Micro Planner Manager, like MicroPlanner X-Pert, offers many project perspectives through continuously updated windows. Shown here are a PERT network diagram and a Gantt time line.

it a good front end to a corporate-wide planning system.

In the same way, Open Plan/Mac works well on very large endeavors. At the Newfoundland Development Constructors consortium, a staff of 50 project managers are tracking more than 2500 workers and 15,000 activities. Open Plan/Mac's flexible database design consolidates cost data and sends it to a mainframe accounting system.

Overall, Micro Planner X-Pert is the most-balanced of the upper-class project managers. Its operation is generally smooth and its reporting module very adaptable. Artemis Schedule Publisher works more simply, but its lack of automatic resource control and need for a separate draw program lower its value. I struggled with Open Plan/Mac; consider it only if experienced support staff are available.

No matter what the scope of your project, you're likely to find low-end, midrange, or high-end project management software to be a useful addition to your bag of management tricks. Getting some help at keeping track of people, resources, money, and time over the course of any project is something that all of us can only get better at. **m**

See *Where to Buy* for contact information.

MIKE HECK is manager of electronic promotions for Unisys Corporation. He oversees large marketing plans and manages the company's electronic publication operations.

1991

Macworld's annual selection of the best art the Mac has to offer

by **Dan Littman**

WELCOME TO A VERY SPECIAL ART GALLERY. This month we exhibit the winning entries in the fourth annual Macintosh Masters art contest. On these pages you'll see a broad range of what computer art has to offer, from intricate and precise graphic design and technical illustration, to alternative realities simulated with 3-D rendering tools, to photographs transformed into new media altogether.

One factor distinguishes these entries from those of years past. Now the computer has moved into the background; computer artists now regard themselves as artists who use computers. To be sure, the entries included a goodly number of computer-art stereotypes—anthropomorphic Macs and science-fiction scenes populated by oddly shaped metallic women—but on the whole, the works' seriousness and devotion to overall design show that most of these artists are no longer trying to imitate pen and paper or paint and canvas, nor are they trying to rebel against them.

But artists who use computers as a medium still experience one major difference from their counterparts who use more traditional tools—cost. We had to assemble a daunting array of expensive technology just to look at the submissions for this contest, starting with about 50MB of applications—that's \$20,000 to

\$30,000 in software. Many computer artists need a significant number of those applications, and need to run them on a fast Mac stuffed with memory and an accelerated 19-inch 24-bit color monitor. And don't forget a removable-cartridge drive with a couple dozen cartridges, and an optical drive to back everything up. These days, that's a basic system for any artist who is serious about color, 3-D rendering, or animation.

The sophisticated entries rendered with those tools were judged by Patrick Coyne, editor and designer of *Communication Arts* magazine; Hugh Dubberly, creative director at Apple Computer; Jane Palecek, art director at *In Health* magazine; Bob Riley, curator of media arts at the San Francisco Museum of Modern Art; and Andrew Stanton, animation director at Pixar. Our distinguished panelists were savvy enough to value creativity and artistic insight ahead of technical prowess per se. Special thanks to Cary Tennis, who spent the better part of six months preparing for the judges' eight-hour visit. Finally, thanks to QMS, RasterOps, and Time Arts, our sponsors this year. All three provided financial support, and RasterOps loaned us a display system. RasterOps is also sending a display subsystem to Marcello Araujo, artist of the work selected as Best of Contest.

MIXED MEDIA



HONORABLE MENTION

**3-D Visualization
of a Reconstructed
Chromosome**

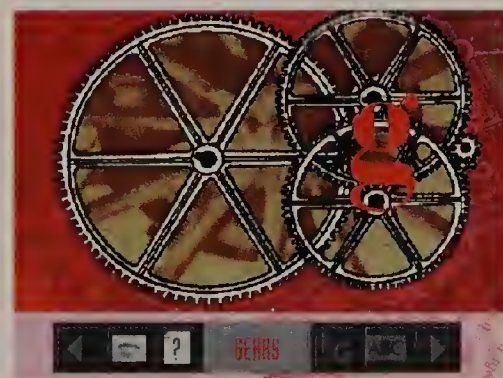
by Kim Wendell and
Mark Wendell

Microphotography
of cell sections;
digitized, imported
into MacroMind/
Paracomp's Swivel
3D Professional.

Macintosh Masters Showcase



**BEST OF CONTEST &
BEST IN CATEGORY**
**ABC—A Book
in a Box**
by Marcello Araujo
Illustrated in Aldus
FreeHand and Adobe
Illustrator; laid out in
Quark's QuarkXPress;
modified in Adobe
Photoshop; animated
in MacroMind/Para-
comp's MacroMind
Director; sound
added with Macro-
Mind/Paracomp's
MacRecorder.



FINE ART



BEST IN CATEGORY
Fever Unleashed
by Martin Maguss
Color scan of
photo modified in
Photoshop.



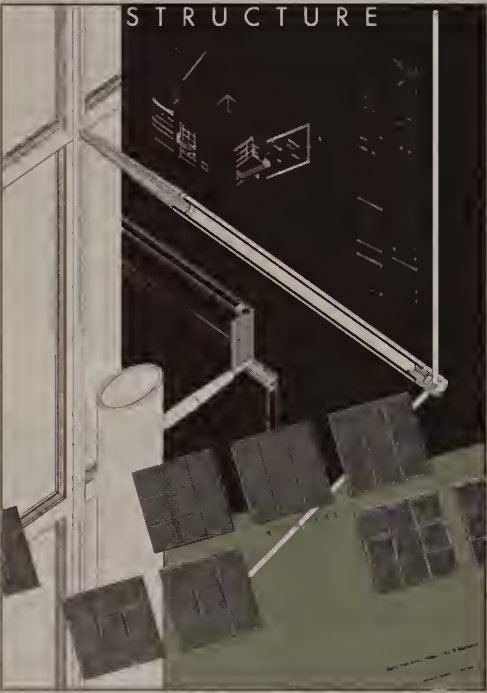
HONORABLE MENTION
**In a Young Boy's
Dreams**
by Frank Morris
Scanned photographs;
3-D modeling in
Strata's StrataVision
3D, composited
and modified in
Photoshop.



HONORABLE MENTION
**Sublime Moment of
Flesh Transcended**
by Allen Toney
Color scan of Potor-
no's *Entombment*
modified in Photoshop
using color palette
from scanned

reproduction of
Rembrandt's *The
Angel and the
Prophet Balaam*.

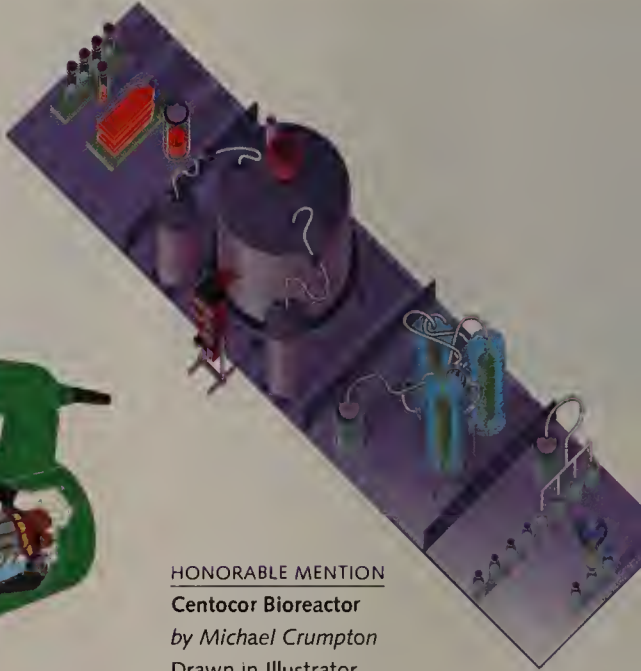
TECHNICAL ILLUSTRATION



BEST IN CATEGORY
**Panels 1, 2, & 3
(detail)**
by Oliver Draxler
Drawn in
Graphsoft's
MiniCad+.



HONORABLE MENTION
Sabre Saw
by Ammill Kam
Drawn in Adobe
Illustrator 88.



HONORABLE MENTION
Centocor Bioreactor
by Michael Crumpton
Drawn in Illustrator.

ANIMATION



HONORABLE MENTION
Maiden Flight
by Mike Connolly
 Modeled in Swivel 3D Professional.



BEST IN CATEGORY
Nick at Nite IDs
by Jim Ludtke
 Modeled in Swivel 3D Professional; texture maps created in Photoshop; rendering and animation in Electric Image's ElectricImage Animation System; synchronized with sound track on a Quantel Harry workstation.

ILLUSTRATION



BEST IN CATEGORY
Mutatis Mutandis
by Darrel Anderson
 Gray-scale scan of drawing; 3-D models rendered in Swivel 3D Professional; composited and modified in Photoshop.



HONORABLE MENTION
Move
by Marcolina Design
 Gray-scale scans of photographs composited in Photoshop.



HONORABLE MENTION
DIANA
by Erik Adigard
 Color scan of photo manipulated in Photoshop; some details created in Illustrator.

GRAPHIC DESIGN

BEST IN CATEGORY
**If You Sleep on Your
Other Side It Will Go
Away**
*by Pattie Belle
Hastings*
Scanned photographs
composited and
modified in Photo-
shop; typography in
FreeHand, Aldus
PageMaker, and
Illustrator; book laid
out in PageMaker.

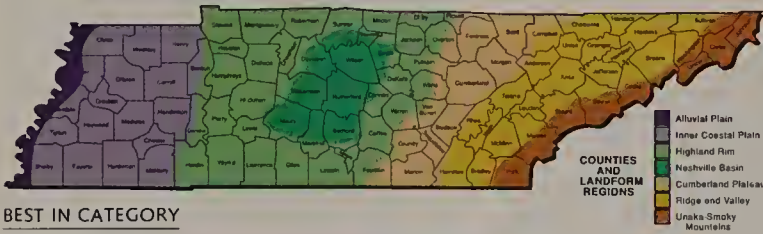


ROBIN GINSBERG

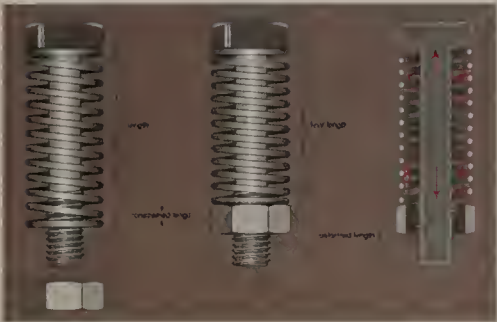


HONORABLE MENTION
No Blood for Oil
by Steve Lyons
Scanned black-and-
white sketch rendered
in Illustrator.

INFORMATION GRAPHICS



BEST IN CATEGORY
Tennessee:
**A Geographic
Perspective (detail)**
by Will Fontanez
Rendered in
FreeHand.



HONORABLE MENTION
Nuts & Bolts
by Elyse Carter
Rendered in
FreeHand.



HONORABLE MENTION
**Downtown Manhattan
Office Building Map
(detail)**
*by Wilbert Cruz
and Martin Haggland*
Rendered in Illus-
trator 88.



HONORABLE MENTION

Tape 1

by Lance Jackson

Images and special effects created with video camera; manipulated in Photoshop; type and line work created in Illustrator; brochure laid out in QuarkXPress.



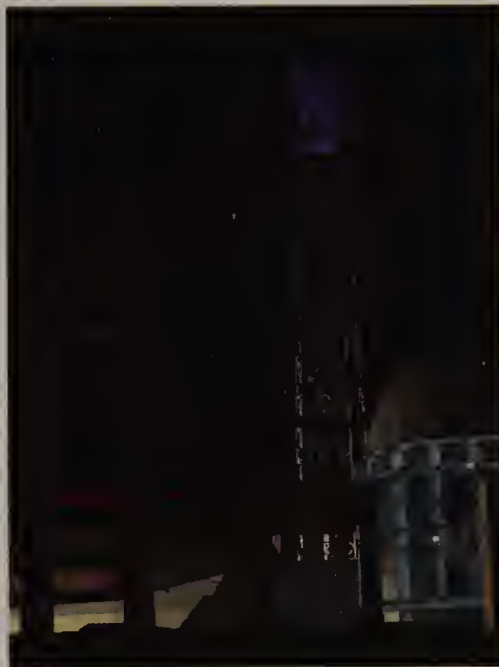
HONORABLE MENTION

Maximum Width

by John Weber

Scanned photos and 3-D objects modified in Photoshop; laid out in FreeHand for 18-inch Linotronic output.

3-D



HONORABLE MENTION

Science Center

by Jim Cheng

Modeled in Aldus Super 3D; surface attributes assigned and image rendered in StrataVision 3D.



HONORABLE MENTION

Toy

by Richard Hawkins

Modeled in VIDI's Design Dimensions; rendered in VIDI's Presenter.



HONORABLE MENTION

AeroDuck

by Darrel Anderson

Modeled with proprietary software; composited in Pixar's Showplace; rendered with custom shaders created for Pixar's MacRenderMan.

A Practical Guide to Publishing CD ROM

How to Make Your

CD ROMS FOR THE MACINTOSH USED TO BE exotic, glimmering discs that arrived in the mail every once in a while. But these days, all sorts of CDs land on my desk frequently. The message is clear: Not only are CDs becoming an important way to publish and distribute digital information of all kinds, it's also not that hard to become a CD publisher.

What Are CDs?

PUBLISHING A CD TODAY IS A LOT LIKE PUBLISHING in print, except that it involves such foreign terminology as *ISO 9660 file format*, *error-encoding*, and *premastering*. Once you learn the lingo, however, there's nothing intrinsically difficult about making a CD, and a burgeoning industry of consultants, service bureaus, and CD manufacturing facilities is eager to help you get started. But it pays to know the technology before you start calling around for bids.

Simply put, CDs are small plastic discs coated with aluminum, lacquer, and ink. Information is encoded on them in a series of micron-size pits arranged in a series of spiral tracks that start in the center of the disc and move toward the rim. A CD player reads a CD by directing a laser beam at the disc and measuring the reflected light. If the beam hits a pit, less light is reflected; if it hits an area on the disc surface, more light is reflected. The drive's electronics translates this pattern of faint and bright reflections into digital data. The elegance of the system is that the data encoded in the tiny pits can be packed very densely, and the CD can be manufactured for a fraction of what it costs to produce a comparable volume of printed matter. CDs are virtually impervious to heat, dust, and shock. They can hold up to 74 minutes of music or up to 680MB of data.

There is no physical difference between an audio CD that you buy at your local music store and a CD ROM (compact disc, read-only memory) from a software store. The difference lies in the information encoded on the disc. Because computers require a higher level of error correction than do human ears, CD ROMs contain a series of error-detection and error-correction codes that are not used in audio-CD recordings.

You can listen to an audio CD on your desktop CD ROM drive, and the audio driver in the System Folder tells the player to stop doing some error-correction checks. But if you use your audio-CD player to read a CD ROM, you just hear a lot of ugly hissing; the player can read the CD ROM, but the information on it isn't music, just data and error-correction codes.

CD ROM Advantages

CD TECHNOLOGY ISN'T PARTICULARLY NEW; it was introduced by Philips and Sony in 1983. Although it quickly became a familiar audio standard, it has taken much longer to become an accepted computer standard, primarily because even the fastest CD ROM players today are much slower than hard drives and other optical media. One of the fastest CD ROM players, NEC Technologies' CDR-73, has an access time of 300 milliseconds, ten times slower than with even a slow hard drive. What's more, CD ROMs are read-only media—you can't write to them—so they're great for distributing data but useless for storage. (See "Recordable CDs" for a glimpse of the future.)

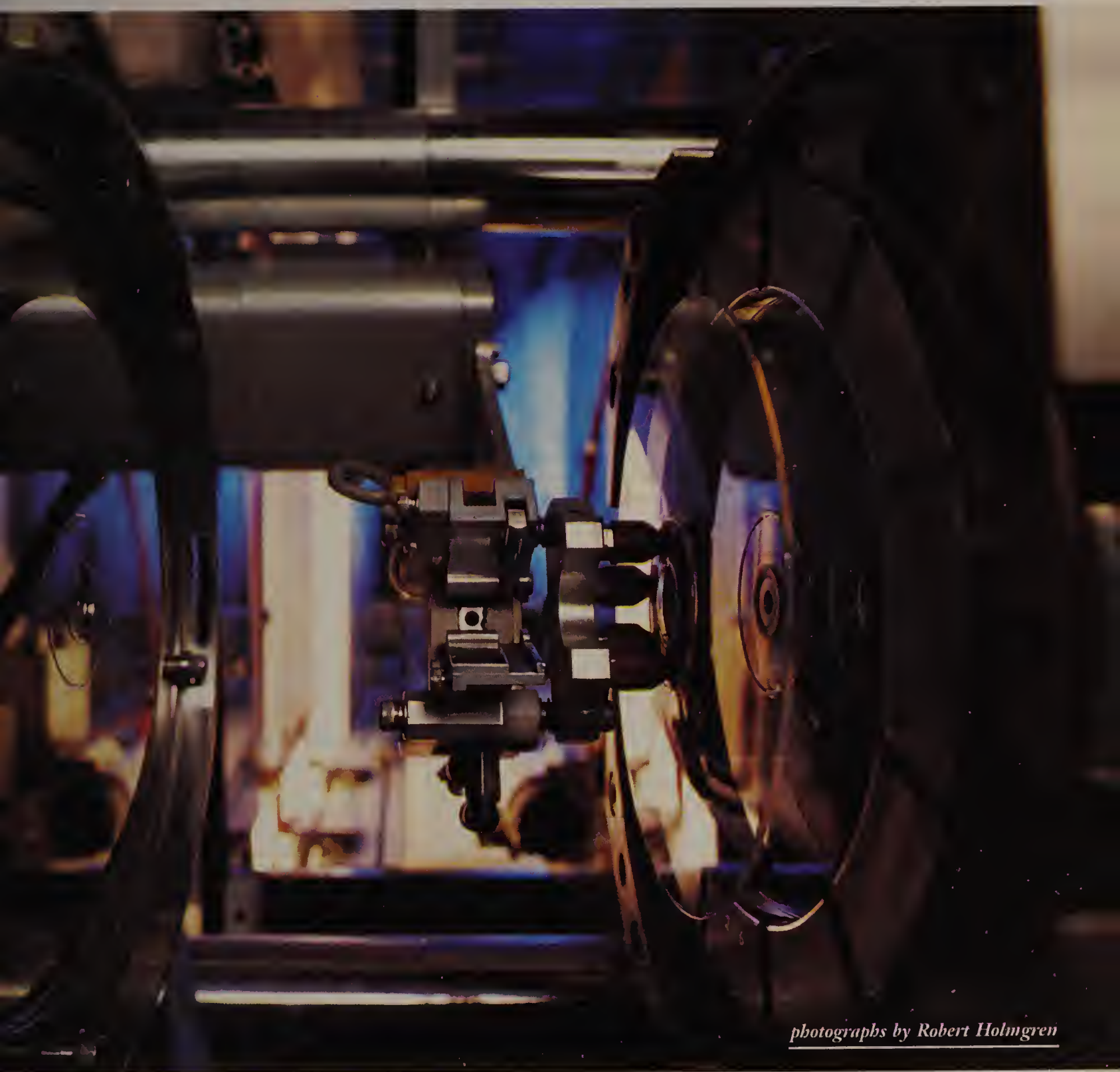
Still, slow and limited as CD technology is, two powerful forces drive CD ROM publishing—economics and multimedia. CD ROMs are the cheapest way to distribute large amounts of data, bar none. If you publish software on multiple floppies, or regularly print and mail thousands of pages of technical documentation

Inside the Factory One human hair can cover up to 200 data tracks on a CD, making clean-room engineering a necessity at 3M's 300,000-square-foot CD-manufacturing facility in Menomonie, Wisconsin. Here, workers inspect a glass master CD coated with a photosensitive film (top). The data will be written on the master CD by a laser. A clear CD heated at several hundred degrees is removed from the molding machine by a robotic arm every 8 to 10 seconds (right).

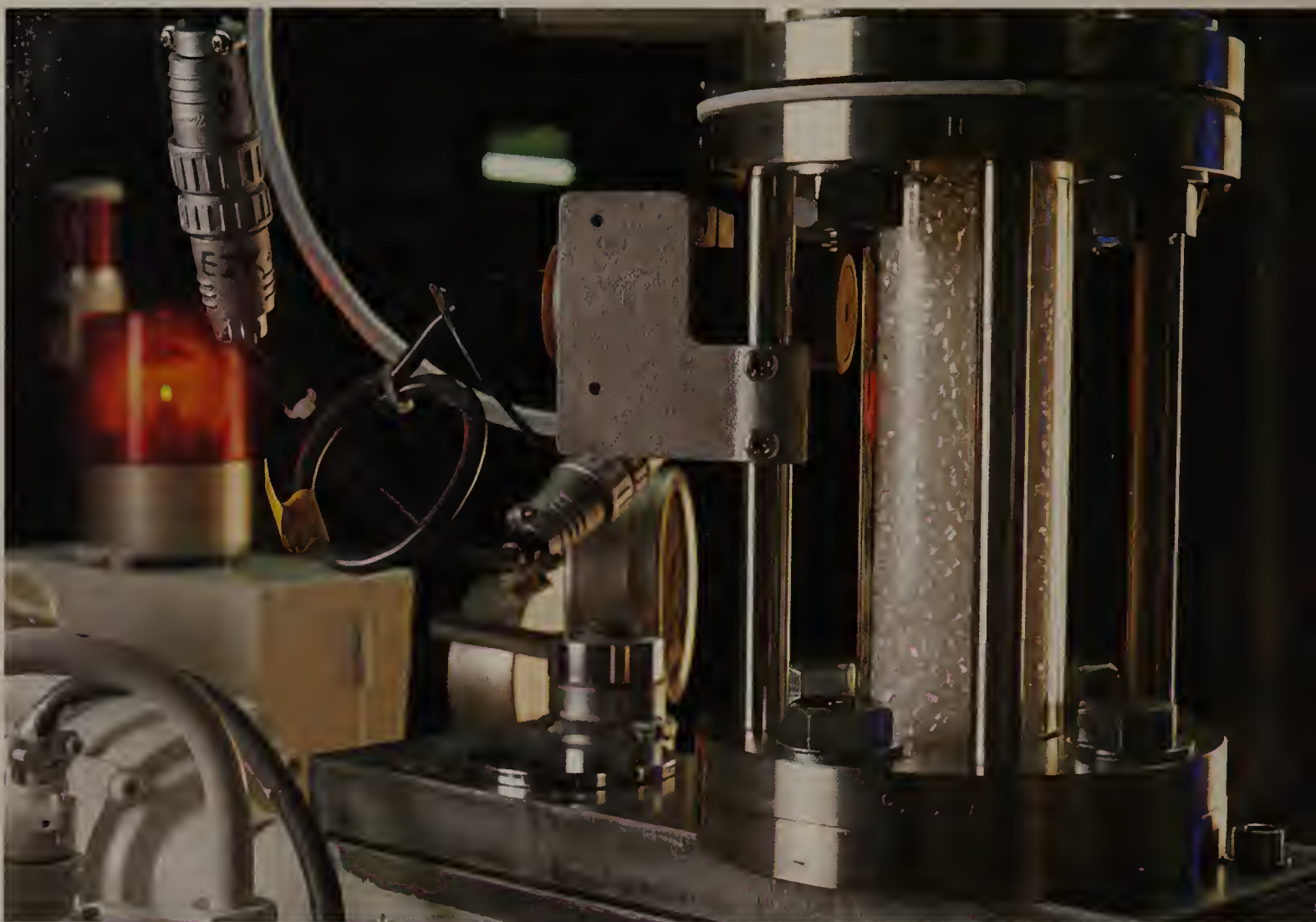


B Y L I Z A W E I M A N

Own CDs



photographs by Robert Holmgren



The Raw Material After being dehydrated in a special dryer, glittering pellets of polycarbonate plastic (the kind of plastic used to make bulletproof windows) are melted at 600 degrees Fahrenheit. Once melted, the plastic is injected into the high-speed molding machine used to stamp out copies of the master image.

or sales-support material, CD ROM publishing can save you money. Because the same manufacturing plants that make millions of audio CDs can also manufacture CD ROMs, you can produce a CD ROM for less than \$2 per disc (see "5001 CDs"). Once finished, a CD can be mailed first-class in a padded envelope for only \$1.44. Duplicating that same 680MB on 800K floppy disks would require 850 of those floppies. And if you tried to distribute that much data on paper, you'd be mailing out approximately 200,000 pages.

And finally, after years of hype, it is becoming easier to create multimedia documents that require the megabytes of space that CD ROMs offer. Apple's new QuickTime system software and a variety of multimedia authoring tools help developers build multimedia documents that incorporate color images, text, graphics, animations, video, and music (see "Multimedia Design Tools," *Macworld*, November 1991). For such documents the CD is the only cost-effective medium.

Before You Publish: Prototype

PUBLISHING A CD ROM CAN BE AS SIMPLE AS collecting all your material on a large hard drive and then sending that drive to a CD manufacturing facility. There the technicians take all the necessary steps to transform your information into a CD ROM, press hundreds or thousands

of discs, package them, and mail them back to you along with the hard drive. All you really need is a large hard drive. And don't bother to buy the fastest drive on the market; the slower the drive, the more closely it will mimic the performance of a CD ROM drive.

Unless you're distributing on CD ROM only such information as a series of PICT or TIFF images or a set of application programs, and expect users to copy the information immediately to their own hard drives, you'll probably want to develop some kind of interface to make it easier to navigate through what can be a daunting array of files and folders.

The Design Process

CREATING THE CONTENT THAT GOES ONTO a CD ROM is an involved process—far more difficult than the disc-publishing process itself—and can require the skills of an entire team of people. For the minimum talent pool needed to create an inviting and interesting CD ROM title, I recommend having an interface designer, a programmer, a graphic designer, and a producer to coordinate all the pieces. After you've worked out a time line, take a deep breath and multiply the expected project duration by at least a factor of two. And don't leave designing the outer packaging of your CD until the last minute—people do tend to judge a CD by its cover.

Once you've identified the content you want to present, secured the legal rights to publish it, converted it into digital form, designed an interface for it, used an authoring tool to pull it all together, and agreed on a package design, you can begin to create a prototype. Prototypes enable you to test the interface design, check for programming glitches, and make sure that the software and data you have selected work well with read-only media. (To get a feel for this, write-protect a floppy and then see what you can and cannot do with it.)

You can make a prototype on a large hard drive or on a series of removable cartridges, but the most convenient method is to make a limited-edition CD, called a one-off, a check-disc, or a write-once CD. These limited editions—the most realistic way to simulate CD performance—are inexpensive to make and easy to mail. And if by some incredible stroke of luck you get it right on the first try, you can send your one-off to a manufacturing facility instead of sending out a costly, fragile hard drive.

Limited-Edition CDs

WRITE-ONCE CDS ARE NOT PRODUCED IN A factory where they would be stamped out by the thousands. Instead they are created on desktop encoder/recorder systems and can be read on any standard CD player. At first glance, write-once CDs look like stamped CDs, but write-once CD media cost \$35 to \$80 per copy (as opposed to a fraction of a cent for stamped CDs), and can take up to 74 minutes to produce.

Blank write-once CDs are coated with a photosensitive, organic polymer dye. When the discs are exposed to the laser beam of the recorder unit, an indentation is formed in the dye. The CD player reads these indentations as if they were stamped pits.

For in-house corporate purposes, or internal archiving, 1 to 15 one-off CDs may be sufficient. In contrast, many factories have a minimum manufacturing order of 100. And even places that don't have a minimum still charge data preparation and mastering fees of well over \$500 for each order.

To make it easier for first-time publishers, though, virtually all CD-manufacturing facilities offer developer discounts for producing either one-offs or limited-edition stamped discs for \$100 to \$1000.

Working with the Pros

OCCASIONAL CD ROM PUBLISHERS, LIKE OCCASIONAL desktop publishers, will probably benefit from a close working relationship with a CD ROM service bureau. Rick Wittwer, president of On-Site CD Services, points out that big CD factories can't always give small publishers the hand-holding they might need. And to a manufacturing facility, virtually anyone making a CD ROM is a small publisher. Production runs on audio CDs are typically in the hundred-thousand range, while a typical CD ROM run is 500 to 5000 units.

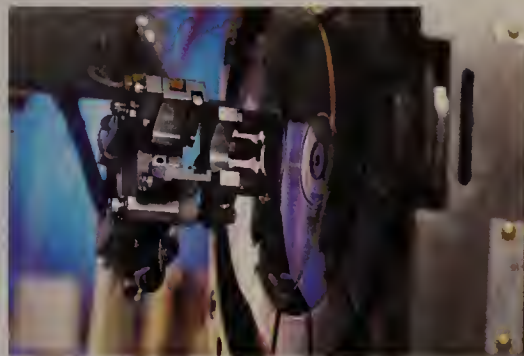
Service bureaus can help developers work with CD ROM file-format requirements, assist in the tricky coordination of audio and CD ROM files, and help find printers who can handle the meticulous printing necessary for CD packaging. Some, like Optical Media International and On-Site CD, offer standardized pricing for replication and mastering services that they subcontract out to manufacturing facilities. Others, such as Meridian Data and CD-ROM Strategies, primarily offer consultation, training, premastering, and CD-development services, contracting out replication on request.

Another way to go is to work directly with a CD-manufacturing plant. If you know what you're doing, or have precise specifications for your end product, working directly can provide added publishing control. You won't necessarily lose all expert assistance by going this route, either, since any good facility provides some technical support.

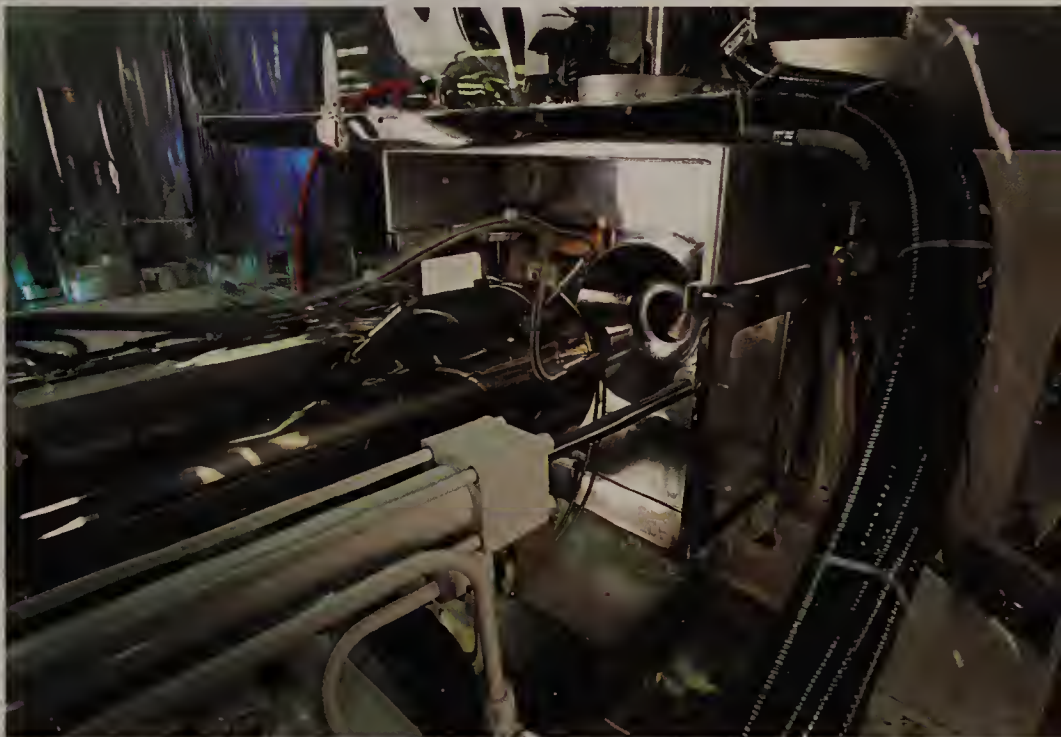
Larry Shiller, president of the Bureau of Electronic Publishing, a CD ROM publisher, toured the factories before selecting one. He looked for an integrated manufacturing line (where CDs were pressed, checked for errors, labeled, and packaged in one continuous line), tight security, a fireproofed room for storing master discs, a clean manufacturing environment, and a commitment to quality production procedures. He asked vendors for their overall error and rejection rates, and demanded that any discs left over from the production run be destroyed to prevent illegal sales. He also asked for a list of satisfied customers and checked those references.

When you feel ready to negotiate a contract with a CD-mastering facility or service bureau,

Disk Replication In the one-second interval before the mold shuts to stamp out a new CD, a disc-take-out arm removes the finished 1.2-millimeter-thick CD from the injection molding machine.



Injection Molding This molding machine presses thousands of microscopic pits into molten plastic, creating an exact replica of the information written on the glass master (see "How to Produce a CD" for more information on the production process).



Sealing the CD When a 500-atom-thick layer of high-grade aluminum has been applied to the clear CD, it is transformed into a highly reflective surface. Then a small amount of liquid plastic is applied to the CD by the curved spraying arm in the basin on the lower right. The disc is then transferred to the upper basin, where it is spun at a high speed to spread the lacquer uniformly across the surface of the disc.

bear in mind that the sales rep will want to know a few parameters before preparing a bid: How will the data be sent to the facility? What kind of CD ROM do you want to publish? What kind of file format do you want to publish in? How many discs do you want to publish? How quickly do you need the CDs? What kind of packaging do you want?

Armed with answers to these questions, the sales rep will prepare a bid that breaks the job down into three parts: mastering, replicating, and packaging. As usual, doing some homework before you sign on the dotted line can save you time and money.

Sending In Your Data

MOST PLANTS ACCEPT DATA ON, AT THE least, hard drives, one-off CDs, SyQuest car-

tridges, 3/4-inch U-matic or 9-track tapes, 4mm DAT or 8mm Exabyte cartridges, magneto-optical drives, and WORM cartridges. All the facilities I contacted have extensive lists of accepted formats, but you should verify that the place you choose accepts what you're able to send. If you must send in your data on a hard drive, be sure to get a receipt and a guaranteed date of return delivery. I've heard horror stories of drives that were returned broken or never returned at all.

If you've already made a one-off CD as a prototype, sending in the one-off is often the easiest thing to do because it provides the technicians with a precise model for the finished product. "Make sure that the people at the mastering facility really understand what you're trying to do," says Brock LaPorte, software engineer at The Voyager Company. "You can't write down too many facts."

What Kind of CD?

THERE ARE TWO BASIC KINDS OF CD ROMs you can publish. Straight CD ROMs incorporate text, audio, graphics, sound, video, and animation as digital data located on the data track, track 1 of a CD. The other, often referred to as a *mixed-mode* CD, mixes computer data with standard CD-quality audio. Audio data is on tracks 2 to 99 of a CD. Publishers who need high-quality music in addition to computer data should choose to make a mixed-mode CD. With a mixed-mode CD the audio plays directly through the audio-out jack of a CD ROM player, which means that the user needs external speakers or headphones to hear it.

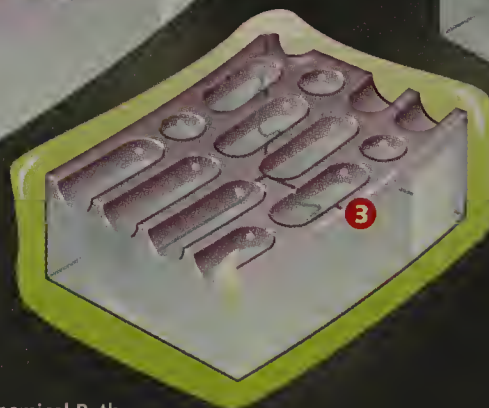
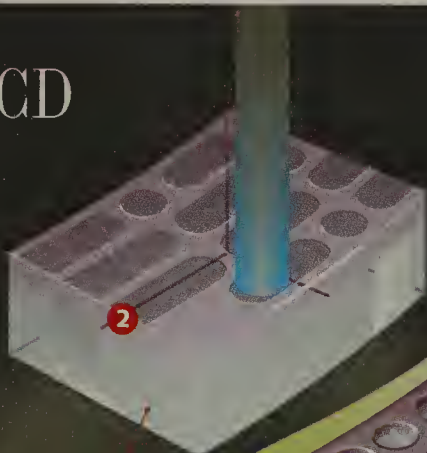
The other key technical decision involves file format. If you know that the CD will be played only on a Macintosh, and you want to



How to Produce a CD

Making a Glass Master

The master disc is a piece of smooth glass that has been coated with a photosensitive chemical film, much like that used in manufacturing semiconductors (1). The master-recorder uses a blue argon laser to write digital data on the master disc. Wherever the laser touches the coated master, the film is exposed, creating a pattern of dots and spaces that represent the encoded data (2).



Chemical Bath
The glass master is immersed in a chemical bath, which washes away the exposed areas of the photoresist film (3).



Coating the Master

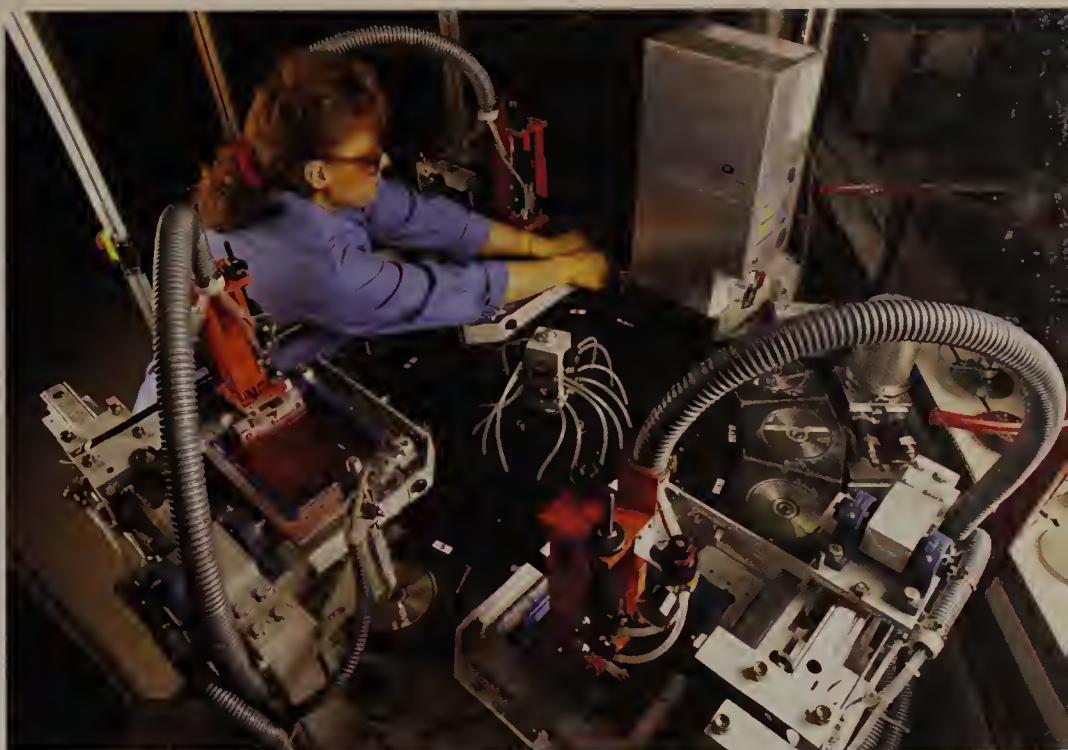
The master is then coated with a metal that conducts electricity and protects the fragile photoresist film from scratches (4). The coated glass master is then placed in a special player that reads the disc and verifies that the information has been written to it correctly.

preserve the normal file icons, you should produce the CD in the native Macintosh file format, the Hierarchical File System (HFS). An HFS-format CD ROM's files and folders will appear exactly like those on your hard drive or floppy disks. A CD that uses HyperCard as a navigation system, for instance, has no need to be cross-platform compatible. According to On-Site CD's Rick Wittwer, 99 percent of his Macintosh clients make HFS CDs.

But CD ROM publishers who look beyond the Mac market enjoy the advantage of a single, agreed-upon file standard, ISO 9660, which guarantees cross-platform compatibility. Any CD created with the ISO 9660 file structure is playable in any other CD ROM drive. To make a cross-platform CD, however, you also need retrieval or authoring software for each platform. For a Windows and Macintosh mixed-format CD, for example, the ideal way to avoid duplicating your efforts is to use a program that runs under both operating systems and can access the same pictures, text, sound, and other effects. You still have to do some translation between the two interfaces and may encounter differences in color, speed, and sound quality, but the core of the application remains constant.

When you're using an ISO 9660 CD on a Mac, the only visible difference is that when you're running programs directly from the CD, the application and document icons appear as generic icons.

There is one other option—a *hybrid-CD*, partitioned to create one section formatted as an HFS disc, and the other as an ISO 9660 disc. Mac users can open up the HFS part and get a native Macintosh desktop; PC users can use the other side. This approach limits each side to only 340MB, however.



The Production Process

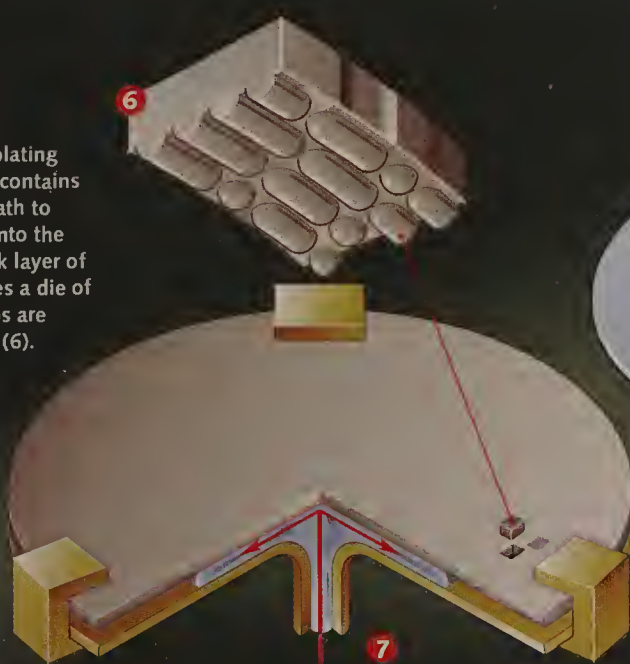
PREMASTERING IS THE PROCESS OF CONVERTING data into CD-readable files with proper formatting and added error-detection and error-correction codes. The data is not changed in any way, but for every kilobyte that goes onto the CD, 144 bytes of error-detection and -correction codes are added by the premastering software. If you send in your data on a hard drive or cartridge, premastering is done at the mastering facility. Most places charge a flat fee for this; those that charge by the hour estimate two to four hours of premastering for most CDs, but this varies with the condition of the data they receive.

Regardless of the form in which you send in the data, every facility goes through a *mas-*

Printing Labels At the printing press, colorful labels are silk-screened onto finished CDs. Even labels can have up to six different colors, each applied by a separate screen at the orange print-screening stations.

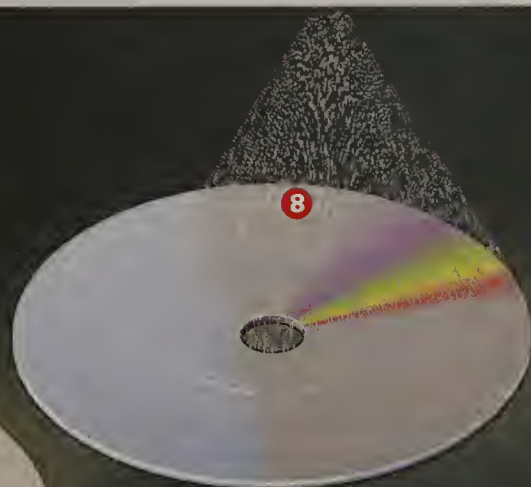
Producing a Stamper

The metal-coated master then goes through a plating system. The master is placed in a solution that contains dissolved metal. A current is run through the bath to force dissolved metal out of the solution and onto the master. Over three to six hours, a 1/16-inch-thick layer of metal builds up on the master (5). This produces a die of the glass master—where there were pits, bumps are formed, creating a stamper for impressing CDs (6).



Stamping Out Copies

The stamper die is placed in an injection-mold machine into which plastic is injected (7). In about eight to ten seconds, the stamper makes pits in the plastic that are identical to the image on the glass master.



Finishing the CD

The clear CD that emerges from the molding machine is then covered with a thin layer of aluminum, to make the CD reflective (8), and coated with a sealant (on which labels can be printed) to protect against scratches and corrosion. The finished CD is laser-scanned to check for defects.



Checking for Errors At the end of the manufacturing process, CDs are laser-scanned to check for errors in printing, holes in the metal, bumps on the surface, and other defects in manufacturing.

tering process. The final data is written onto a glass master disc that is used to make a nickel stamper. Plastic is injected into molding machines and stamped with the nickel stamper to make the clear, unfinished CDs, which are then coated with aluminum, labeled, and packaged (see "How to Produce a CD").

The more CDs the manufacturer presses at one time, the less you pay per disc. Most factories charge about \$2 per disc for quantities up to 500, and this price falls all the way down to \$1 per disc for pressing 10,000 or more at Nimbus Information Systems. You can always decide to produce more CDs later, of course, and charges vary for master storage, reorder, and setup. Optical Media International will store your masters indefinitely; DMI-PDO feels that the fidelity of the master cannot be guaranteed longer than six months and, if needed, will make you a new master at no charge. Most factories waive the reorder charge, but Sony charges \$125, with a minimum order of 100 discs.

The biggest hidden costs in the whole CD ROM-publishing process are rush charges. Expect to pay extra for everything from mastering to shipping if you need the CDs right away. The least expensive way to make a CD is to ask

5001 CDs

Company	Metatec/Discovery Systems
Premastering	ISO 9660/HFS/High Sierra \$400, Mixed-mode ISO 9660/HFS \$100
MASTERING	\$1400
REPLICATION AND PACKAGING (per disc)	\$1.75
Minimum order	no minimum
Master storage/ reorder charge	1 year/\$250
One-off charges	NA
Special developer package	mastering, 10 replicas in jewel box or CD-View Pack, 7-day turnaround \$250 credit toward further mastering \$480
ESTIMATED TOTAL COST:	\$10,551.75

* 3-working-day turnaround. The costs above are list prices (e

for the maximum turnaround time. At DMI-PDO, for example, you can get 5000 CDs for only \$1.33 per disc in 15 days, but if you need them back in only one day, that same order will cost you \$2.10 per disc—a nearly 60 percent premium for poor planning. Same-day service is available from Metatec/Discovery Systems, if you don't mind paying \$2650 for the same mastering services that would cost \$1200 if you were willing to wait 10 days.

Recordable CDs

For publishers who regularly produce limited-edition CDs, purchasing an in-house CD-publishing system might be a good alternative to buying one-offs from service bureaus or factories.

Two years ago it cost \$150,000 to buy a write-once CD system, and it was the size of a washing machine. Today, it will run you about \$30,000 for a write-once system, and the system has been condensed into two boxes, each about the size of a Macintosh II.

Using either Meridian Data's MacCD system or Optical Media International's MacTopix-CDR systems, you can hook up a Mac II-family Mac or an SE/30 to a Sony write-once system (the CDR Write Once CD Recorder CDW-W1, and CD Encoder CDW-E1) and produce your own one-offs. The MacCD system retails for \$27,000 and includes hardware and software for creating Macintosh HFS file-format CDs. The MacTopix system uses the same Sony system, but with software for pre-mastering, CD simulation, and creating a Macintosh HFS or ISO 9660 file-format or mixed-mode CD (HFS with CD audio). The system ranges in price from \$995 to \$7995, depending on the capabilities you buy. (The Sony CD writer is an additional \$24,000 from MacTopix.)

If the \$30,000 range is beyond your means, don't despair. The price will fall by half again soon. Last October JVC announced the Personal ROM Maker, a one-box write-once CD-drive subsystem that for \$12,000 will include pre-mastering software, an encoder/recorder unit, and a 600MB SCSI hard drive. The drives will support all current CD file standards and will play on all CD players. They are scheduled to ship with a Macintosh interface by the time you read this. Media for this system will cost \$35 to \$80 per disc, but industry experts expect this to fall to \$15 to \$20 as the volume of orders increases.

The biggest CD news items of 1992 should be the expected finalization of the international standards that will allow a write-once CD to be written in incremental stages and read on any CD player (the Orange Book standard), and the consumer availability of the Kodak Photo CD system. The Photo CD system will initially enable people to receive their own photographs on CDs produced at photofinishers with special write-once technology developed by Kodak. The format will ultimately allow sound, text, and graphics to be recorded, making write-once technology available at the corner photo shop.

CD-ROM	Nimbus Information Systems	3M Corporation	Sony Corporation of America	On-Site CD Services	Optical Media International
25/hour	5 hours of load time \$250; hour additional \$85	HFS or ISO 9660 \$300, HFS and ISO 9660 \$60	\$125/hour	included in mastering fee	\$250 *
500	\$1150	\$1400	\$858	\$995	\$1300
85	\$1.90	\$1.85	\$1.63	\$1.70	\$2.00
minimum	200 discs	none	no minimum	200 discs	100 discs
months/no charge	1 year/\$150	1 year/\$500, 5-day turn- around (includes 50 CDs)	1-2 years/\$125	yes/\$350	indefinitely/\$500
each, 5-day turnaround	\$450, 5-day turnaround	\$750 (additional copies \$50, max. 5)	\$250, 3-day turnaround; \$350, 2-day; \$500, 1-day	\$195, 4-5 day turnaround, \$350, 24-hour turnaround	\$250, next business day (encoding fee may apply)
mastering, 5 replicas, 2 color labels, jewel boxes, 5-day turnaround 500. Additional disks, 51-200 80/disk, 200 or more \$1.70/disk	NA	mastering, 10 replicas, jewel boxes, 5-day turn- around \$650	mastering, 100 replicas, 7-day turnaround \$1000	In S.F. Bay Area: \$450 for first CD recorded on-site; additional CDs, \$150	possible 15% discount for certified Apple developers
1001-85	\$10,901.90	\$10,951.85	\$9259.63	\$9496.70	\$11,552.00

* for 5001 CD ROMs, 5-day turnaround, HFS only, 2-color label, jewel-box/shrink wrap packaging, data sent in on hard drive.

Packaging Issues

MOST STANDARD JOB BIDS ASSUME YOU WILL be creating a CD with a one- or two-color label that is screened on top. Printing extra colors costs extra—from \$30 at Sony (for the third color) to \$100 per color at 3M Corporation. However many colors you choose, you'll want to send positive film, emulsion-side up and color-separated, to the factory.

The hard, clear-plastic jewel box is the most common kind of packaging, but also among the most expensive. With labels mechanically placed in the front and back of the box, plus shrink wrap, it costs 35 cents per disc everywhere I checked, except at Nimbus, where it costs 40 cents per disc. If you want a lower-cost alternative, place the disc in an envelope, a clear plastic bag, or a cardboard sleeve; your costs will run between 10 cents and 15 cents per disc—a \$1000 savings on a 5000-disc order.

If you choose to use the jewel box with paper inserts both in front and back, work with a printer who has done such a job before. All factories send out specification sheets for the paper inserts; because these pieces are inserted mechanically they must be printed with great precision. If they are even slightly too big, you'll be charged for manual insertion. Some manufacturing facilities have agreements with printers who can deliver the finished inserts directly to the factory floor.

Adding It All Up

THE CD ROM INDUSTRY IS STILL IN ITS INFANCY. Every manufacturing facility and service bureau is eager to work with new customers and will negotiate prices aggressively. Prices vary depending on how often you plan to publish, how complex your publishing needs are, how well-prepared the data that you send in is, how complex your packaging will be, and how quickly you need everything back.

This is a competitive market; for our hypothetical job, the most expensive quote for the



total CD-publishing cost (\$11,552, from Optical Media International) was only 25 percent more than the least expensive total CD-publishing cost (\$9259.63, from Sony)(see "5001 CDs"). A real project will most likely require additional technical support and customer service that could easily make the differences among bids much less significant. Finding good service is the most important part of choosing a manufacturer for your job.

In the end, manufacturing a CD is relatively easy and inexpensive. This is a good thing, because it will free your time and money to tackle the more formidable, and more expensive, task of creating the engaging experience that has made CD ROMs a new force in the publishing industry. **m**

See *Where to Buy* under Making CD ROMs for contact information.

The End of the Line In the final step, workers put the discs in hard-plastic jewel boxes (like those used for CD audio recordings) and shrink-wrap them for final delivery. It takes only three minutes for a disc to travel all the way from the injection molding machine to the staging area for packaging.

Taking Stock of System 7

MANY PRODUCTS NEGLECT NEW FEATURES

by Lon Poole

ENOUGH ABOUT what System 7 is supposed to do someday. Let's talk about what it does and does not do today. On the positive side, it accesses and organizes information more effectively, extends total available memory (on most Mac models), shares files, offers interactive help, opens multiple programs at once, gets programs talking to each other, and looks pretty (see "Confessions of a System 7 User," *Macworld*, July 1991). And more programs work with System 7 all the time.

But System 7 costs money, consumes available memory and hard drive space, complicates using the Mac, and knows slow. Moreover, most applications and utilities ignore important System 7 capabilities, so you rarely get all the benefits the system software offers.

Compatibility and Reliability

OF THE 43 POPULAR PROGRAMS I EXAMINED closely for this article, 20 neglected

two or more major System 7 capabilities—such as those involving 32-bit addressing, cooperative multitasking, publish and subscribe, program linking, balloon help, and full TrueType functionality.

Were those 20 programs incompatible with System 7? No, all 43 were fully compatible. To understand why, see "System 7 Features Implemented" and "Rating Compatibility."

Initial compatibility problems underservedly cast a shadow on System 7's reliability. "Apple went out of its way to make sure things wouldn't crash with System 7," said Lloyd Chambers, chairman of Salient Software. "The blame is wrongly assigned."

My experience bears out user reports that fully compatible software, on the whole, fails less often with System 7 than it does with System 6. Several software developers told me that System 7 fixes an enormous number of bugs that were in System 6 for years. "System 7 is much more stable than System 6 ever will be," said Chambers.

Why So Little Savvy

THAT FEW POPULAR PROGRAMS HAD significant problems with System 7 six months after Apple released it didn't surprise me. But I expected more programs to take advantage of System 7's central capabilities (as Apple would say, to be System 7-savvy) by then. After all, Apple had been feeding developers infor-

mation about System 7 for two years before its release.

Many developers tired of waiting and went ahead with their own plans, trying to make their software merely compatible with System 7. "MacDraw Pro had some System 7 capabilities in it, but we had to take them out because we wanted to ship the product and the System 7 schedule kept slipping," said Hank Skorny, product marketing manager at Claris.

After System 7 shipped, some developers still resisted putting the brakes on their own development goals to implement Apple's System 7 agenda. Intuit, for example, preferred adding accounting features to Quicken 3.0; publish and subscribe, program linking, and other System 7 capabilities didn't make the cut. Global Village Communication chose to concentrate on adding fax features to its fax-modem software. And according to Quark founder Tim Gill, "System 7 is prettier but offers few advantages to the bulk of QuarkXPress users."

Some System 7 capabilities were much harder to implement than developers expected. For instance, Adobe Illustrator 3.2's engineers found most System 7 features easy to add but spent months on publish and subscribe because of the complexity that subscribing added to the Undo command. Despite trouble exploiting System 7, however, most developers are committed to doing so eventually.

Your Own Publishing Empire

PUBLISH AND SUBSCRIBE'S AUTOMATIC document updating is a welcome new feature. Too bad it comes through a complicated procedure and confusing terminology. Publish and subscribe acts like copy and paste, except you have to keep track of numerous edition files and learn nonintuitive definitions; *publishers* and *subscribers* are parts of documents, not whole



documents. Why didn't Apple simply extend copy and paste, which everyone grasps quickly? Because in a network environment, you don't want to give others access to whole documents just so they can select parts and make live copies. Publish and subscribe keeps source documents private.

A few developers have added to publish and subscribe's confusion by implementing rogue user interfaces. Microsoft Excel 3.0, for example, makes finding publishers and subscribers difficult by not displaying borders around them. In addition, Excel 3.0's Edit menu has no Subscriber Options or Publisher Options commands for manually updating or canceling publishers and subscribers. Instead you must either double-click the publisher or subscriber (if you can find it, without borders) or use the awkward Links command.

Claris Resolve and many other applications conserve Edit menu space by putting all publishing and subscribing com-

mands in a Publishing submenu, a method Apple did not originally endorse but now does. Deneba's Canvas 3.0 uses an unorthodox Edition Options submenu to list Publisher Options, Subscriber Options, and other commands. Variations in the publish and subscribe interface mean you have to figure out and remember several slightly different procedures instead of one consistent procedure.

Consistency aside, Quark's Tim Gill dislikes the whole publish-and-subscribe approach. He thinks the procedure inherently assumes a document has only one version—the latest—no backup version and no audit trail of incremental changes. Imagine trying to lay out a publication containing subscribers whose contents and sizes change while you're not looking.

Apple thinks publish and subscribe take a needed first step. "It would make sense to extend publish and subscribe to include a higher level of revision control, and we see this as the responsibility of system software," said Pam Deziel, Apple's



Lloyd Chambers, chairman of Salient Software, says System 7 is far more stable than System 6.

IAC (interapplication communication) product manager. But Apple hasn't yet said if or when it might deliver that improvement.

Program Linking and Beyond

UNLIKE PUBLISH AND SUBSCRIBE, WHICH require your active participation, program linking—when programs send and receive messages called Apple events—happens automatically, behind the scenes. Many applications recognize the four basic Apple events—Open Application, Open Document, Print Document, and Quit Application. Dantz Development Corporation's Retrospect cleverly interprets the basic Apple events to let you select files, folders, and disks for backup or archive by dragging them into the Retrospect icon. Some applications recognize more than the four basic Apple events. Software Ventures Corporation's MicroPhone II 4.0 will send Apple events to StuffIt Deluxe 3.0 (still under development) to decompress downloaded files. Articulate Systems' Voice Navigator II and Deneba's Canvas 3.0 go a step further by exchanging many Apple events to achieve voice control of Canvas.

Apple events also provide the foundation for system-wide user scripting. QuicKeys 2.1.1, for example, lets you send Apple events as part of a QuicKeys macro. True scripting languages—which function like a system-wide version of HyperCard's HyperTalk or an Excel macro—include UserLand Frontier, a user-scripting product, and Simple Software's ControlTower, a point-and-click scripting system still under development at this writing.

System-level scripts can automate a process involving several applications or networked computers. For example, a network administrator could write a script with Frontier that would clean up every Macintosh in a school computer lab after students have finished for the day. The script would direct replacement of essential files accidentally deleted by students, remove extraneous files, and report what

Rating Compatibility

With so much nebulous hype surrounding the implementation of System 7 features, it's prudent to learn a few factors for rating software for System 7 compatibility. To be considered mostly compatible, a program merely needs to hobble along in System 7. Such a program can have problems ranging from minor ugliness to significant but isolated incompatibilities that you can usually avoid but that may cause crashing, freezing, or unexpected quitting.

To be considered compatible, a program must work as well with System 7 as with earlier system software. A compatible program doesn't crash even when virtual memory and file sharing are turned on. But it does not have to work while other programs are open, unless it did that with MultiFinder active in System 6.

If a compatible program takes advantage of some or all of System 7's most significant capabilities, Apple and the program's developer consider it System 7-savvy. But because this term has no set definition, to understand what a program offers, you have to look for specific features and capabilities. Here's a checklist to consider.

- Cooperates in System 7's multitasking by sharing processor time with other open programs.
- Works with 32-bit addressing turned on.
- Has balloon help, ideally for all menus, dialog boxes, tool palettes, and special window controls in their various states (active, inactive, and so on).
- Allows setting any font size and avoids font conflicts by identifying fonts internally by name.
- Permits incremental font scaling (increase or decrease size by a set amount).
- Allows publishing, subscribing, or both (as appropriate).
- Provides standard publisher and subscriber options.
- Shows borders of publishers and subscribers you select.
- Lets you show or hide borders of all publishers and subscribers.
- Allows subscriber adornments (changes that affect the whole subscriber).
- Allows stopping all publisher and subscriber updates.
- Recognizes the four basic Apple events that the Finder sends.
- Recognizes more than the four basic Apple events.
- Doesn't clutter the System Folder with preference files, temporary files, and so on. Uses special folders as needed—Preferences, Extensions, Control Panels.
- Has complete icon families—black-and-white, 16-color, and 256-color icons in standard and small sizes—for the program, all document types, and stationery.
- Knows how to handle stationery.
- Includes a New Folder button in the Save dialog box.
- Includes the program name in all documents so the Finder can always tell you which program opens a document.
- Opens Data Access Manager query documents, which greatly simplify retrieving data from complex databases.

actions were taken. But don't expect to script your system anytime soon. Only a handful of applications currently recognize enough Apple events for meaningful user scripting.

Here's Help in Your Eye

USER SCRIPTING IS STILL IN THE FUTURE, but many programs do offer balloon help—and what a great idea it seems at first. A Macintosh expert watches over your shoulder describing objects you point at. Unfortunately this expert blabs indiscriminately. “Close box . . . Title bar . . . Zoom box . . . Apple menu . . . Application menu,” it drones whenever your pointer passes over those objects. You try only pointing at objects you don't know, hoping to at least learn something from the incessant chatter. Then you studiously avoid pointing at anything. Finally you realize you'll never get anything done until you turn off this obnoxious kibitzer. What a waste of a basically sound concept.

“Is balloon help effective for advanced applications?” asks Adobe product marketing manager John Kuhns. “Do our users really want this help?” Apparently not, Adobe concluded, leaving balloon help out of Photoshop 2.0 and Illustrator 3.2.

You might use balloon help more if you could customize it, perhaps by setting options in a Help control panel (see “Hypothetical Help Control”). For instance, you might prefer all help text in a floating palette that stays where you put it.

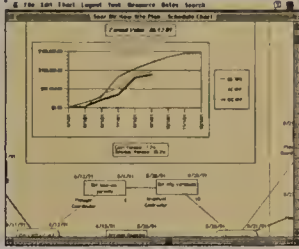
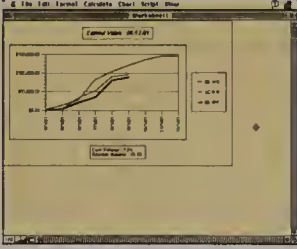
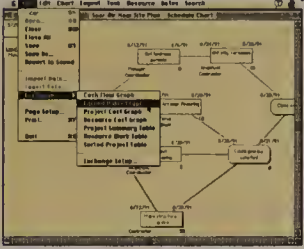
Please Pass the Memory

TO USE SYSTEM 7 YOU MUST CONFRONT its appetite for RAM and disk space. Apple's suggested minimum of 2MB of RAM leaves about 750K, enough to open one midsize application and maybe a couple of desk accessories. You can free up enough additional memory for opening a second small program or installing a system extension if you don't use a network (no networked printer, no file server, no E-mail, and no file sharing) by installing Apple's System 7.0.1 Tune-Up software and turning off AppleTalk in the Chooser. You'll be happier using System 7 with 4MB of RAM. Then you can open two or three applications at once, install a few extra system extensions (formerly called INITs), and share files on a network. None of this is possible in 2MB.

For advanced graphics, intensive page layout, and

Using Program Linking

Program linking uses System 7's Apple events to combine the strengths of two or more programs, such as the project-management features of Claris MacProject II v.2.5 and the charting abilities of Claris Resolve.



1 Apple event: Open Application: "Claris Resolve"

After building a project schedule with start dates, completion dates, and costs in MacProject II, choose a status graph or summary table from the Exchange submenu. MacProject II sends the Apple event "Open Application" to Resolve, which then opens as if you double-clicked its icon.

2 Apple event: Do Script "Earned Value Graph"

MacProject II then sends the Apple event "Do Script" to Resolve, naming a Resolve script (previously written in a language similar to HyperTalk, and placed in the Claris folder within the System Folder). The script draws the graph using data that MacProject II saved in the Claris folder.

3 Manually switch and paste

To complete the process, you manually switch to MacProject II and paste the Resolve graph directly into the project window. This step could be automated if MacProject II and Resolve recognized more Apple events.

the like, go for more than 4MB of RAM. System 7's 32-bit addressing capability lets you use more than 8MB of RAM on most Mac models (although not on a Classic, SE, Plus, or Portable). Be careful, though, because some software (old versions in particular) crashes if you turn on 32-bit addressing. This includes applications, desk accessories, system extensions, control panels, and hard drive drivers. (For information on hard drive software see *Quick Tips*, *Macworld*, March 1992.) Turning 32-bit addressing on and off frequently isn't practical because you must restart the Mac each time. To use 32-bit addressing on older Macs, such as the IICx, IICx, II, and SE/30, install Connectix's Mode32 system extension. Apple now distributes it free through dealers, user groups, and online information services.

In addition to RAM, System 7 takes a big chunk of hard drive space—3MB to 20MB, depending on the number of fonts, system extensions, and control panels in the System Folder.

When you need to open an extra program or two, System 7's virtual memory capability may help you keep working on some Macs. It treats hard drive space as if it were RAM, with some limitations. System performance becomes impractically slow if you try to use too much virtual memory (as a rule of thumb, virtual memory

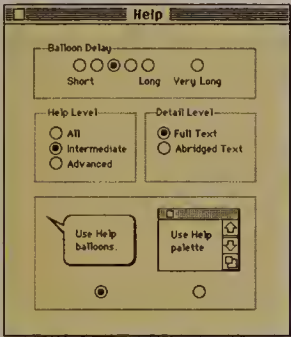
plus RAM should not be greater than double the installed RAM) or to open a large program that needs more memory than you have installed in RAM. Virtual memory is reliable with System 7—compatible programs (a few mostly compatible programs have trouble), but system performance suffers, sometimes dramatically. The fastest hard drive is far slower than RAM. Moreover, virtual memory chews up hard drive space at a prodigious rate.

Unless you turn on 32-bit addressing along with virtual memory, your total memory is limited to 14MB, less 1MB for each installed NuBus board. (Built-in video counts as one NuBus board on a IICx, IICx, or Quadra.) You must turn on 32-bit addressing to use virtual memory if you have more than 8MB of RAM installed. System 7's virtual memory doesn't work at all in Macs with a 68000 microprocessor because their ROM lacks the necessary information. (Accelerating with a 68020, 68030, or 68040 adapter doesn't help.) If your Mac came with a 68020 microprocessor, add a PMMU (Paged Memory Management Unit) chip to use virtual memory.

System 7's virtual memory conflicts with the built-in virtual memory of some applications, such as Adobe Photoshop and ColorStudio, at times drastically retarding performance. And turning virtual memory on and off requires restarting the Mac, a disruptive and time-consuming process.

Memory Management—A Game of Skill

WITH LOTS OF MEMORY, WHETHER VIRTUAL or real, you can happily keep multiple



Hypothetical Help Control A Help control panel like this would make balloon help more flexible. You could suppress help balloons below your level of expertise, adjust the pause before a balloon appears, select how much text you want to read, and determine where help text appears.

programs open at once under System 7. Unless you can keep all the programs you ever use open (not likely), you still have to quit a program now and then to make room for opening another. Before you know it, you can't open a program even though there's enough memory available. You are suffering from fragmented memory.

System 7 can't amalgamate bits and pieces of unused memory. You must free a contiguous block of memory big enough for the program you want to open by quitting programs in the reverse of the order in which you opened them. To forestall memory fragmentation, methodically open programs in order of most frequent use. Apple's System 7.0.1 Tune-Up software tries to help with memory management but can actually hasten memory fragmentation. To quit programs to make space for opening another program, a tuned-up System 7 suggests quitting those with no open windows—or the largest, if all have open windows—regardless of the order in which programs were opened. Unless you quit programs in the reverse of the order in which they were opened, you fragment memory.

You may also find that the system software memory size (which includes the Finder) creeps steadily upward during a work session. To bring the system software memory size back down you must restart the Macintosh. System 7.0.1 Tune-Up is supposed to reduce this problem, but doesn't eliminate it.

Memory management ought to be easier. The Tune-Up software helps if you have only 2MB to 3MB, but System 7 provides almost no help in managing the large amounts of memory made available by virtual memory and 32-bit addressing. Apple should offer the easy fix of showing the order in which programs were opened in About This Macintosh.

Font Strife

SYSTEM 7 FURTHER COMPLICATES LIFE with TrueType fonts. True, they look great in any size on screen or from any printer, but this is nothing new. Adobe Type Manager (ATM) has done the same with PostScript fonts since 1989. TrueType throws off spacing in some documents originally formatted with equivalent fixed-size (bitmap) fonts or ATM-PostScript fonts. For example, you may need to adjust the widths of spreadsheet columns, HyperCard fields, and database layout fields and labels. TrueType also slows down printing unless you install the System 7.0.1 Tune-Up software. Recognizing that many people would rather stick with ATM, Apple teamed with Adobe and now practically gives away

ATM in the United States. And the two companies have agreed to put ATM technology in a future version of System 7 (although to make use of ATM, you still must buy PostScript fonts). Nonetheless, TrueType fonts won't disappear because they generally cost less than PostScript fonts; for example, TrueType versions of the basic LaserWriter fonts come free with System 7.

File-Sharing Snags

APPLE MAY BACK AWAY FROM TRUETYPE, but it won't abandon System 7's file sharing. Networked computing is an important Macintosh selling point, and like program linking, file sharing offers a major new reason to connect the Macs in an organization.

Of course file sharing involves trade-offs. The minute you turn on file sharing, the Mac slows down a little and surrenders about 300K of memory. When someone else starts sharing your files, your Mac slows down a lot. Fantasies of getting Ethernet cabling to replace LocalTalk cabling come to mind when more than a half-dozen people regularly share files at the same time. Pretty soon you realize that this sluggish personal file sharing was never meant to replace a dedicated file server.

Security represents another weak link in the file-sharing scheme. System 7 wants you to share files. By default it gives everyone on the network full access to the items you share. You must work to restrict access, first by setting up registered users and groups to whom you allow access, and second by setting access privileges on the items you share. Setting access privileges is easy, but knowing which privileges to set is not. Neglecting to register users and set access privileges opens your computer to network invasion.

Network Insecurity

HACKERS INVADING YOUR NETWORK? Your hard drives are at risk if you use System 7 and you are connected to a network, whether you use file sharing or not. If your machine is turned on, someone who spends 40 seconds at your keyboard can open your Sharing Setup control panel, change your owner password (without knowing your current password), start file sharing, close the control panel, and leave no sign. Then, from another Mac on the network, this hacker can connect to your Mac as its owner and have access to everything on your hard drives. In that case, at least you might notice where files have been changed; or you would see that your password had been changed if you try to log on from another Macintosh. But a less easily detectable invasion involves al-

tering access privileges with the Users & Groups control panel and the Finder's Sharing command and takes only five to ten minutes.

Apple could make systems more secure by adding password access to the Sharing Setup and the Users & Groups control panels. On another level, you can password-protect disks or folders using software available from several companies (see "Solving Your Security Worries," *Macworld*, June 1991). Otherwise you must either remove the File Sharing extension from your Extensions folder or trust everyone with access to a Mac on your network.

SYSTEM 7 FEATURES IMPLEMENTED

	Minimum Memory	File Sharing
4th Dimension 2.2.1	510K	●
Adobe Illustrator 3.2	2000K	●
Adobe Photoshop 2.0	1300K	●
Adobe Type Manager 2.02	NA	●
After Dark 2.0v	NA	●
Aldus FreeHand 3.1	1500K	●
Aldus PageMaker 4.2	1500K	●
Aldus Persuasion 2.1	1000K	●
Aldus SuperPaint 3.0	1000K	●
Canvas 3.01	750K	●
Claris Resolve 1.0v2	750K	●
ClarisWorks 1.0	768K	●
FileMaker Pro 1.0v2	640K	●
Foxbase+/Mac 2.01	1200K	●
GreatWorks 1.0	1024K	●
HyperCard 2.1	750K	●
M.Y.O.B. 2.1	384K	●
MacDraw Pro 1.0v1	1500K	●
MacPrint 1.3	NA	●
MacProject II 2.5v1	390K	●
MacroMind Director 3.0	700K	●
MacWrite II	590K	●
Mathematica 2.0.3	784K	●
MicroPhone II 4.0	384K	●
Microsoft Excel 3.0	512K	●
Microsoft PowerPoint 2.01f	380K	●
Microsoft Word 5.0	384K	●
Microsoft Works 2.00e	224K	●
OmniPage 3.0 ¹	3072K	●
On Location 2.0	NA	●
PixelPaint Professional 2.0.1	4096K	●
QuarkXPress 3.1	1700K	●
Quicken 3.0	512K	●
QuickKeys 2.1.1	NA	●
QuickMail 2.5	NA	●
Retrospect 1.3	768K	●
StatView II v1.04	512K	●
Suitcase II 2.0	NA	●
Swivel 3D Professional 2.0.11	4000K	●
UserLand Frontier 1.0	1024K	●
White Knight 11.12	1000K	●
WordPerfect 2.1	700K	●
WriteNow 2.2	200K	●

● = yes; ○ = no; ◐ = partially implemented; NA = not applicable

Well Slow Me Down

SYSTEM 7 USERS AGREE THE NEW SYSTEM software feels slow. In particular, the Finder opens folders, scrolls windows, and copies to a floppy and duplicates files on a hard drive more slowly than before, even with System 7.0.1 Tune-Up installed (see "System and Finder Speed"). In compensation many new Finder capabilities—including aliases, outline views of folders, the fast Find command, tunneling through folders from the active window to the disk level, faster copying to hard drives, and working in the background—help you work more efficiently.

The directory dialog boxes you get

with Open, Save, and other drive-related commands also feel slower in System 7. It often takes longer for the directory list to appear, and scrolling is slower. Here again, aliases compensate by shortcutting through the folder hierarchy. And some of the slowdown can be attributed to color windows and scroll bars. Performance improves as you reduce the number of colors in the Monitors control panel.

Fortunately, application programs seem as fast as always. My informal tests show little slowdown in scrolling documents, switching pages in Aldus PageMaker, carrying out Photoshop filter operations, or recalculating spreadsheets.

Upgrade Costs

GETTING FULL BENEFIT FROM SYSTEM 7 takes money unless your Mac already has plenty of RAM, plenty of hard drive space, System 7 installed, and no old software. Everyone who bought any new Mac (except the cheapest Classic) since last May got System 7 for free. The rest of us can buy it from an Apple dealer for \$99, or without Apple's manuals from a user group for under \$50. Dealers also sell Apple's group-upgrade kit on CD ROM for \$350. Apple offers System 7.0.1 Tune-Up on disk for a small shipping fee (call 800/947-5176). You can also get Tune-Up from Apple dealers, user groups,

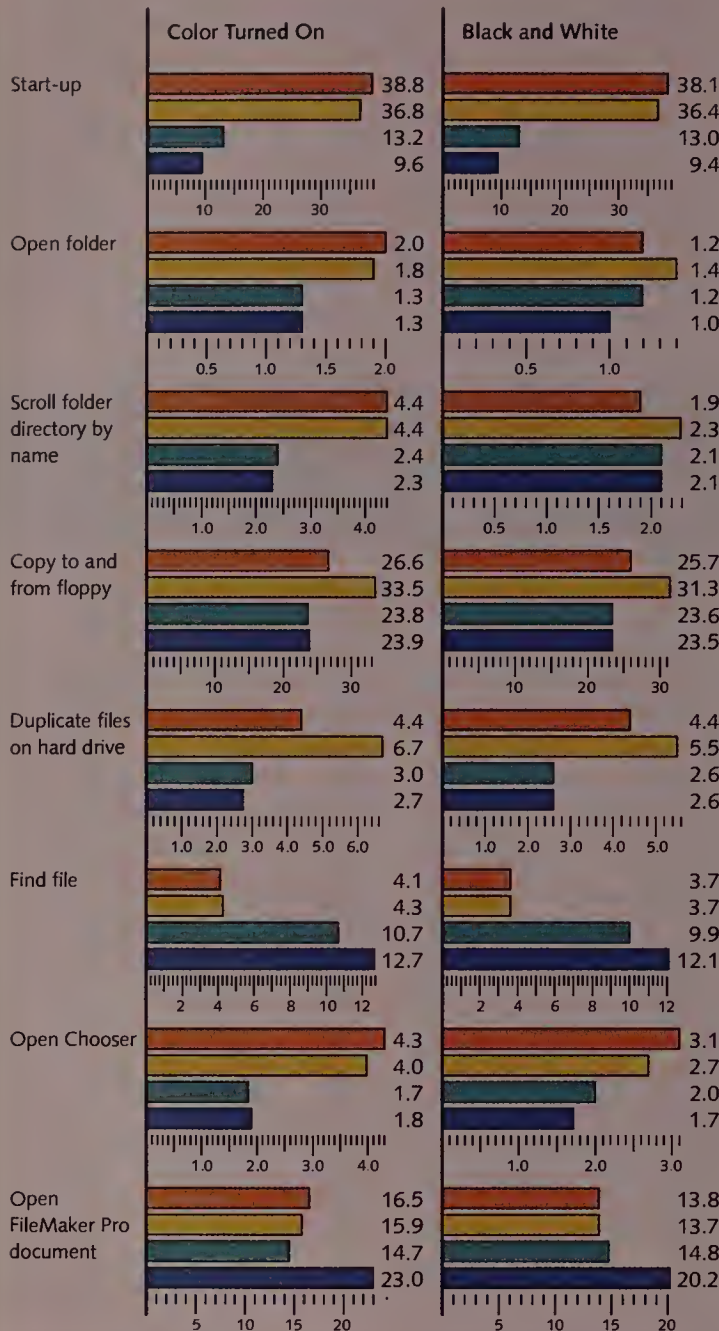
Virtual Memory	32-Bit Addressing	Publish	Subscribe	Publisher/ Subscriber Borders	Basic Apple Events	More Apple Events	Any Font Size	Balloon Help	Multi- tasking- Aware	Complete Icon Families	Handles Stationery
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not tested and not documented by vendor. ¹ OmniPage Professional implements additional System 7 features.

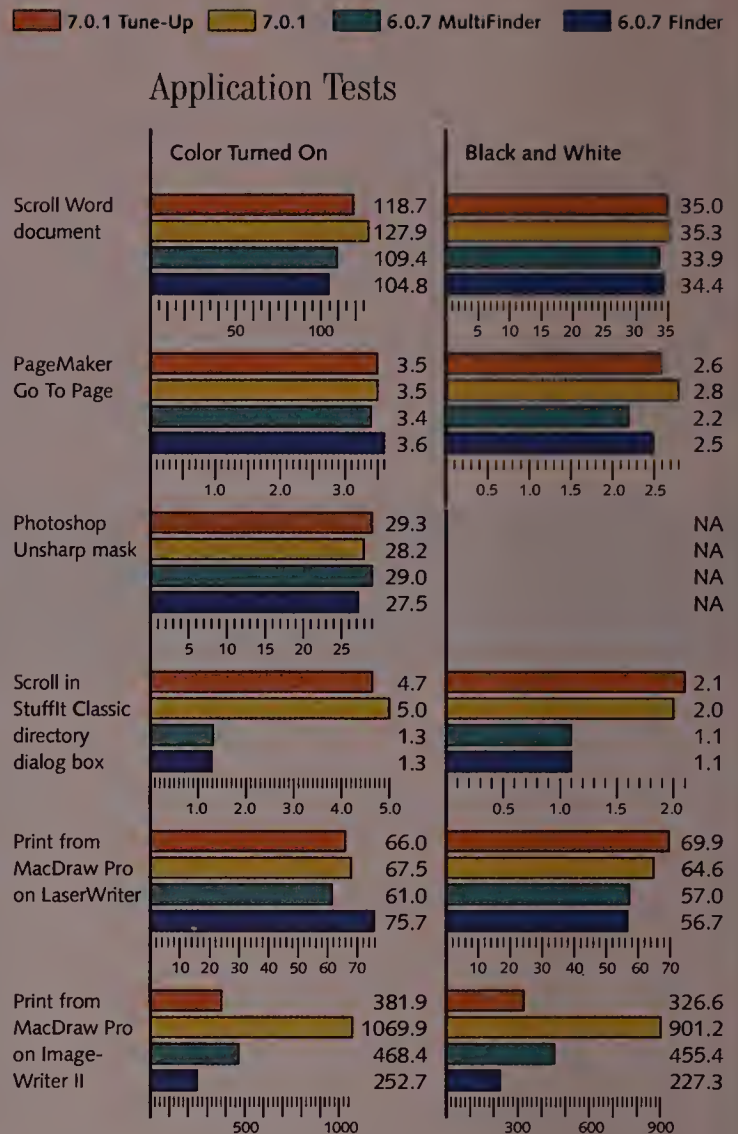
System and Finder Speed

Times are
in seconds.

System and Finder Tests



Application Tests



These charts compare 256-color and black-and-white performance of System 7.0.1 with and without Apple's System 7.0.1 Tune-Up software, and of System 6.0.7 with and without MultiFinder. Displaying in color slows down many activities. The Finder copies and duplicates files more slowly under System 7, but Tune-Up helps quite a bit. Tune-Up also improves TrueType font handling. It accelerates printing 10-point Helvetica on an ImageWriter II using TrueType, but barely affects printing the same font on a LaserWriter using PostScript. All tests were run on a Macintosh IIci with 8MB of RAM (with standard 256K cache) using built-in video. File sharing, virtual memory, and 32-bit addressing were turned off in System 7.0.1. Standard system software was installed using the Installer program (we installed no TrueType fonts in 6.0.7 and standard TrueType fonts in 7.0.1).

AppleLink, and electronic information services for the cost of distribution.

Upgrading RAM from 2MB to 4MB costs \$120 to \$250, depending on where you buy the SIMMs and whether you install them yourself (see *Quick Tips*, March 1992 and August 1991). An external hard drive—for a larger System Folder and virtual memory—starts at about \$250 for 40MB. The cheapest network connectors and cables cost about \$40 per computer.

The only open-ended cost involves upgrading application programs, desk accessories, and other software. While most developers offer System 7-compatible versions for little or no cost, they may

charge \$50 to \$150 for an upgrade that includes significant new features.

Bowing to the Inevitable

GIVEN ITS COST, MEMORY AND DRIVE-space consumption, here-and-there slowness (partially ameliorated by Tune-Up), and complexity, System 7 has yet to earn the fanfare that preceded and accompanied its announcement. But System 7 delivers a substantially improved Finder, virtual memory (on most Mac models), file sharing, multiple programs open at once, outline fonts, and various cosmetic improvements. With a growing number of applications, System 7 also delivers 32-bit

addressing, balloon help, publish and subscribe, program linking, and the promise of user scripting.

While its drawbacks may dissuade you from using System 7 for awhile, as more applications exploit it and as Apple fixes System 7's problems, you'll find it increasingly hard to say no. The Macintosh community is not going back to System 6. **m**

See *Where to Buy* for contact information.

Contributing editor LON POOLE has covered System 7 for Macworld since August 1989. He even wrote a book about it—*Macworld Guide to System 7* (IDG Books Worldwide, 1991).

Coming soon to a screen near you.



Out of memory.

OK

If you think the only way to avoid running out of memory is to avoid running a couple of your favorite applications, think again.

Think about all those memory-hogging fonts and sounds you've got stuffed into that bulging System File.

Then do what over 200,000 resourceful Mac users do every day.

Instead of closing your applications, open a Suitcase.™

Suitcase is the award-winning utility that lets you park your growing collection of fonts, DAs, FKEYs and sounds *outside* the System File.

Thereby giving you the maximum amount of memory for running more applications, building bigger documents and doing other useful things.

What's more, Suitcase compresses your screen font and sound files by up to 60%.

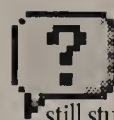
Thereby giving you that much more precious disk space to work with.

It even lets you put your screen and printer fonts on a server for all to share.

Thereby making each disk on the network that much more spacious.

The more resources you have—and the more organized you are—the more memory and disk space you'll save.

But whether your dividends are measured in megs or merely in Ks, Suitcase is guaranteed to save you gigabytes of aggravation.



Even if you're operating in System 7.

Because System 7 still stuffs your resources into your System File.

And System 7 still makes you close down all your applications and restart your Mac each time you install a new font.

Which is a real pain in the, uh, system.

Suitcase, on the other hand, gives you unlimited access to all your resources.

And total control over how you organize them.

Each suitcase can pack up to 800 fonts, 64 DAs, and any number of FKEYs and sounds.

You can group suitcases into sets, then summon all the luggage that

Can't remember the difference between Versailles and Monaco? Not to worry. Suitcase displays your typefaces right in the menu.

belongs with a particular project at the click of a mouse.

Tips are optional. But here's one for those of you who find font ID conflicts even more irritating than running out of memory.

Get Suitcase. It eliminates them.

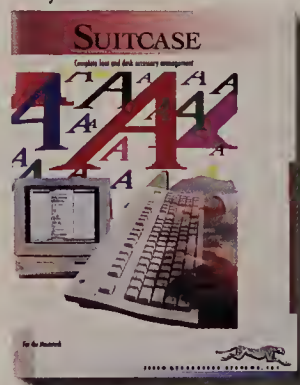
Call us at 1-800-477-8212.

We'll tell you about our vaunted 24-hour toll-free technical support.

We'll also tell you that Suitcase is backed by a one-year money-back guarantee.

So you can be sure this baggage will live up to its claims.

Anchen
<i>Aison</i>
Avant Garde
Baskerville
Berkeley
Bodoni
Bookman
Caledonia
✓ Chicago
<i>FlashScript</i>
Futura
Galliard
Garamond
Helvetica
Italia
Janson
Kabel
<i>Los Angeles</i>
Lubalin Graph
Lucida
MACHINE
Monaco
New York
Optima
Palatino
San Francisco
Times
Trump
Univers
Versailles
Zapf Dingbats



FIFTH GENERATION SYSTEMS, INC

Circle 151 on reader service card

Reviews

IN THIS ISSUE: Lotus 1-2-3, Microsoft Word, Connections, PowerTrax, Voice Express, Voice Navigator, MacInTax 1991, HyperTax Tutor, HAM, DayMaker, and more

Spreadsheet Program

Lotus 1-2-3

PROS: Well-designed hybrid of DOS product and Mac features; superior database and help; easy-to-use graphics; true multisheet documents. **CONS:** Minor file-import and performance problems.

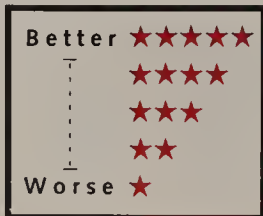
COMPANY: Lotus Development Corporation (617/577-8500; 800/343-5414). **REQUIRES:** Mac Plus; 2MB of RAM (3MB for System 7); hard drive; System 6.0.4. **LIST PRICE:** \$495.



'LL GET RIGHT TO THE POINT: Lotus 1-2-3 for Macintosh is an excellent product. After the early history of Jazz and the nonhistory of Modern Jazz, no one expected Lotus to make a Mac product that would be anything but a pastiche of half-implemented good intentions and programming compromises. Instead, Lotus 1-2-3 has both the features and the political credentials to give Microsoft Excel a real challenge in the market.

Serious Business

LOTUS FACED A UNIQUE PROBLEM. 1-2-3 had sold about 16 million copies of its DOS and other versions—the Mac was a glaring omission—so Lotus had to make a true Mac version of 1-2-3 that was compatible with other Lotus products. Lotus did this by taking code for a relatively advanced version (it appears to be closest to 3.1 rather than 1-2-3 for Windows), designing a Mac interface to run the command set, while allowing DOS hands to pop up the old-style commands with the slash key (/). Lotus also had to maintain compatibil-



Michael Steenberge, director of information services at Corning Incorporated, uses Lotus 1-2-3 for Macintosh and will be exchanging financial data with non-Mac users.

ity with all the macro code developed in DOS versions, while accommodating Mac users' demands for less cryptic macros, and keep the set of @functions similar across platforms. 1-2-3 for Mac is remarkably unobtrusive: to a Mac user it seems like a real Mac product with a generous set of DOS file formats and external database functions, but a PC user can run the program as if he or she were using DOS 1-2-3. The only anomaly for the DOS user is that no DOS version is as good as 1-2-3 for Mac. Whereas Excel for Windows routinely trounces all versions of 1-2-3 for PCs in most comparisons, 1-2-3 for Mac is comparable to Excel in many respects and better in some key areas.

Scorecard

AT RAW SPREADSHEET PERFORMANCE, 1-2-3 for Mac is respectable but not a leader. Recalculating a large budget spreadsheet, 1-2-3 shows a recalc time within a few percent of the results for Re-

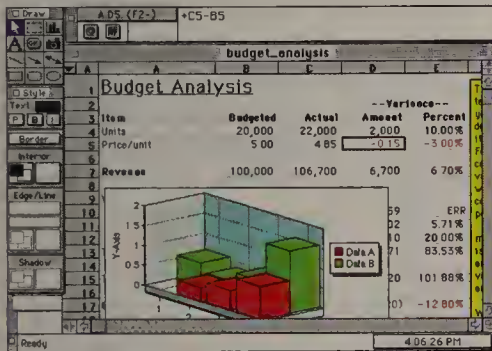
solve and Excel; basically, all spreadsheet vendors use nearly identical intelligent recalc schemes. On a spreadsheet filled with built-in math functions, 1-2-3 is distinctly slower than Resolve (and, although not shown, Wingz) and slower than Excel. The results indicate that for most business purposes 1-2-3 is as fast as its competitors, and for calculation-intensive engineering purposes it's not. Since the math function set is smaller than its competitors', 1-2-3 is not a first choice for science and engineering anyway, unless a user wants access to the range of 1-2-3 macro libraries. Business users will have no complaints about performance or range of financial, statistical, and database functions.

Despite the slick graphing features of Resolve and the greatly improved graphing in Excel 3.0 over 2.2, 1-2-3 beats these products in graphing ease-of-use. You select a range of numbers with the mouse, pick 1 of 16 two- and three-dimensional

graph types from a palette of graph-type icons, and the program pops up a nicely formatted graph in the worksheet itself. Most Mac spreadsheets let you open any graph element with a double-click and then modify the element in a dialog box, but Lotus intelligently anticipates the look you are most likely to want and minimizes the number of modifications you are likely to make. Even without the users' guide, you can get exactly the graph you want in less than a minute. No other spreadsheet or stand-alone graphics program can make that claim. You can even shrink graphs to be little icons on your worksheet so that you can still see your worksheet numbers, and then open them with a double-click to see the latest changes.

1-2-3 for Mac offers true 3-D spreadsheets. For example, rather than putting a set of monthly budgets into one huge spreadsheet, you can store each month's budget on a separate but linked sheet (the set could be labeled A through L, with a summary sheet M) in a single document with one name. You can write formulas that operate through the whole document—the formula `@SUM(A:D3..L:D3)` would add the contents of cell D3 across the whole set. This implementation of linkage is more sophisticated and more useful than anything available in Excel 3.0 or Resolve.

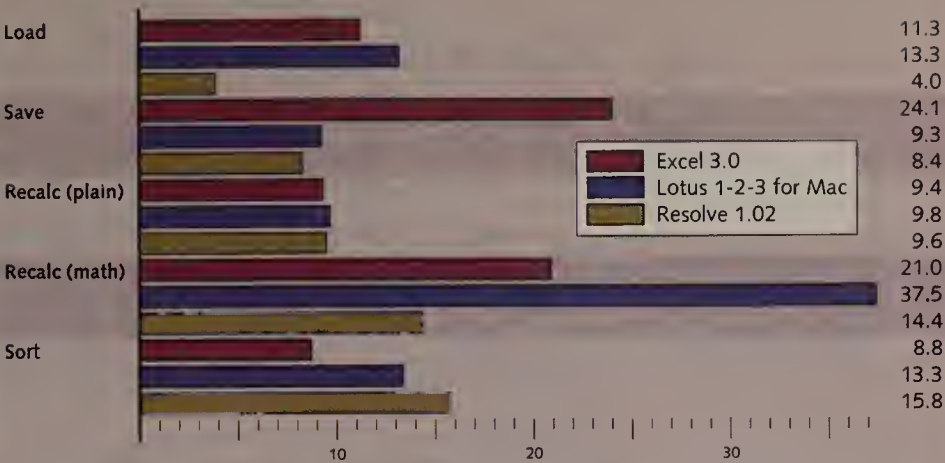
Network-administration functions are grouped under the File menu, and direct interchange of data tables between spreadsheet and database are managed both by Data Access Language (DAL) linkage and direct command linkage to dBase and FoxBase databases. The internal spreadsheet database functions of 1-2-3 for Mac more nearly resemble a modest but complete application than the minimal query capabilities usually offered in spreadsheets. The form used for browsing the database allows you to update data in the spreadsheet through the form view, the form itself can contain graphics, and you can perform relational joins of tables to generate new tables. Although publish



Successful Plots Graphs are shockingly easy to create, modify, and manage on a page. Besides a respectable gallery of graph types, 1-2-3 provides a command for collapsing graphs to icon size to save space.

Comparing Spreadsheets

Times are in seconds.



Recalc was performed on two large (10,000-cell) work sheets: a plain, budget-style work sheet with mixed text and arithmetic, and a math work sheet with intensive use of special functions (sin, exp, log). Load and Save refer to the plain work sheet. Sort was performed on a single field in a database with 1200 records of 10 fields each.

and subscribe functions are supported under System 7, most businesses will find that access to dBase or even Oracle databases (using DAL) are more important in the near term.

Finally, the documentation is solid but undistinguished, although the explanation of Mac system features for DOS 1-2-3 users captures perfectly the wide-eyed tone of a ninth-century Byzantine guidebook detailing the wonders of Constantinople for visiting Balkan merchants. The Guided Tour is not as effective instructionally as an interactive HyperCard tutorial, but the Help system in 1-2-3 for Mac is outstanding. It's cross-indexed in several different ways, so that utter neophytes and old DOS hands and Excel converts can take their own rapid paths through the thicket of information.

@SUM(This Column)

THE CURRENT MAC VERSION DOES leave room for improvement: import of tabbed text files produces frequent errors (import of native application files is better); it doesn't save to SYLK format, required for most third-party spreadsheet utilities; it doesn't save files in Excel 3.0 format; it lacks outlining; its solver function is pretty basic compared to Excel's; it can translate your little ten-line macros from DOS 1-2-3 or from Excel 2.2, but it chokes on complex commercial macro sets (with DOS macros, mainly for printing and display reasons; with Excel macros, mainly due to function-set incompatibility). But 1-2-3 has many strengths and no serious weaknesses, and the biggest installed base in the history of software. It holds its own against any Macintosh spreadsheet. At last, Excel finds itself in a real two-horse race.—CHARLES SEITER

Word Processor

Microsoft Word 5.0

PROS: Improved interface and keyboard shortcuts; excellent System 7 support; modular design allows easy addition of new features; many features improved. **CONS:** No macro language (yet); weak drawing features; file-format changes may cause importing problems with other programs; can't access balloon help when a dialog box is open.

COMPANY: Microsoft Corporation (206/882-8080). **REQUIRES:** Mac Plus; System 6.0.2; hard drive; 2MB of RAM to use grammar checker.

LIST PRICE: \$495.



THE WORD IS OUT—WORD 5.0, that is. The Mac world's most popular program hadn't seen a major upgrade since 1989. The last three years have also brought a new version of Word's biggest competitor, WordPerfect. Word 5.0 compares favorably against it—in most areas.

Word 5.0 sports a long list of new features—among them, an on-screen formatting ribbon for convenient character formatting; support for System 7's publish and subscribe features; a built-in grammar checker and thesaurus; a drawing window for creating simple graphics; a terrific Find File command that lets you locate files by name or other criteria; a voice annotation feature that lets you attach recorded comments to documents; new mouse and keyboard editing shortcuts; and more customizing features.

But what's new is only half the story. Microsoft has also streamlined and en-

continues

hanced many of the program's existing features. A new Print Merge Helper walks you through the process of creating personalized form letters. The Find and Replace commands can search for and replace formatting attributes and style sheets as well as text. Commands are more logically arranged within Word's menus, and keyboard shortcuts for common commands such as Select All finally match those of other Mac programs. Word 4.0 users will need to adjust to some of these changes; however, they're summarized in Word 5.0's documentation.

Word 5.0 may be kinder and gentler, but it's also bigger and fatter. In its default installation, the program uses roughly 5MB of hard drive space and 1MB of RAM. To use the grammar checker, you need at least 2MB (4MB if you use System 7). Word 4.0, by comparison, would run (or at least crawl) on a Mac 512KE with two floppy drives. You can use the Finder's Get Info command to reduce Word's memory requirements to as low as 512K; but the program will run slowly, and many of its new features won't work at all.

Easier Editing and Formatting

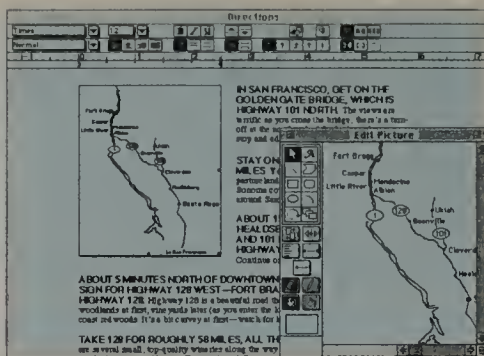
BESIDES ITS NEW MENUS, THE FIRST thing you notice when you start Word 5.0 is its formatting ribbon. The ribbon gives you one-click access to fonts and sizes as well as to bold, italic, and underline styles. You can also use the ribbon to create two- or three-column page formats.

Between the ribbon and the ruler (which is similar to Word 4.0's), you can perform common formatting tasks with a few mouse clicks. One annoyance: because of an animation effect, the ribbon and ruler each take about a second to appear. I'd sacrifice the animation for speed.

Word's editing shortcuts, unmatched in version 4.0, are now even better. The best improvement is *drag and drop* editing—you can move text or a graphic by simply selecting it and then dragging it to the destination. When you release the mouse button, Word moves the selection—no cutting and pasting needed.

Other enhancements: You can shade paragraphs or table cells in .5 percent increments. (Alas, you can't shade characters themselves.) You can specify type sizes up to 16,383-point; Word 4.0's maximum was 127-point. You can select a paragraph by triple-clicking within it, and the entire document by triple-clicking within the selection bar. A new Symbol command lets you quickly locate and insert special characters.

The new drawing window lets you create or alter object-oriented (MacDraw-type) graphics. It's handy for rotating or



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trary to the way balloon help is supposed to work.) As for performance, Word is slower at scrolling through a document, but faster at opening and saving documents and at searching and replacing.

I would like to have seen more interface similarities between Word and the just-released Word for Windows 2.0. Although the two programs have more in common with each other than their predecessors do, there are still significant differences that will complicate life for offices that use both Macs and DOS PCs.

Microsoft has accomplished an impressive feat—it polished and added to Word's capabilities while still enabling the program to run well on less-endowed Macs. Word 5.0 is a worthy heir to the Mac world's word processing throne. As new plug-in modules appear, it's only going to get better.—JIM HEID

Information Management Systems

Connections 2.0

PROS: Highly customizable telephone directory; can attach voice or custom alarms to appointments and reminders; can set one-click links between entries in any module; group calendar for up to 30 networked users. **CONS:** Extremely slow; several bugs. **COMPANY:** Concentrix Technology (415/358-8600). **REQUIRES:** Mac II; 2MB of RAM (4MB for System 7); System 6.0.5. **LIST PRICE:** \$199.



PowerTrax 1.1

PROS: Full search capabilities; excellent routines for managing telemarketing and marketing plans. **CONS:** Repetitive, time-consuming data entry routines; numerous programming errors. **COMPANY:** Soft Solutions (404/457-9400). **REQUIRES:** Mac Plus; System 6.0.5. Recommended: 2.5MB of RAM. **LIST PRICE:** \$495.



INFORMATION-MANAGEMENT SYSTEMS are supposed to bring new levels of organization, clarity, and control to your life and business. After all, when you're deluged with appointments, reminders, phone calls, and to-do items during a hectic workday, software that can't keep up with you is hardly an asset.

Connections, a new HyperCard-based personal directory/planner, and PowerTrax, a heavy-duty business-contact management tool based on ACIUS's 4th Dimension, store, track, and report information admirably, but they need serious streamlining.

Connections

CONNECTIONS, DESIGNED BY HyperCard expert Danny Goodman, is a combination daily planner, monthly calendar, and phone and address directory. Because these components are fully integrated, you can build direct links between entries in any of the three modules; a reminder on your daily planner to call Mr. Jones, for example, can be linked with a mouse-click to the Mr. Jones card in the phone book.

On the daily planner, a graphic time line provides an overview of the day's appointments, while to-do items, reminders, and telephone calls are listed in separate boxes. Reminders and appointments can trigger custom audio alarms. You can also view your activity on the full-screen monthly calendar; a click on any date provides that day's schedule and reminders. In the phone directory, autodialing a number instantly brings up a Call History dialog box, so you can track the length of your call and keep a record all your calls. The directory also allows you to address envelopes, create headings for letters to contacts, and print directories using any of three Day-Timer organizer formats. It's easy to customize the directory—rename fields, for instance—even if you're not familiar with HyperCard.

A fourth Connections module, Personal Libraries, allows you to take notes, write letters, and create customized stacks that you can link to the calendar/planner/directory. A group calendar feature allows up to 30 different users on a network to use Connections for group scheduling.

The major problem is that data entry processes are often infuriatingly slow. When you want to add a new appointment or reminder, there is a pause of several seconds before a dialog box appears on the screen. After you've entered the pertinent data, each reminder, to-do note, or appointment takes at least another six seconds to be posted on the planner—even on a Mac IICx. Posting a recurring appointment (a staff meeting the first Monday of each month, for example) throughout the calendar can take a few minutes. Concentrix does warn that you'll get slower performance on a Plus, SE, or Classic, but even on Macs equipped with the swifter 68030 microprocessor, the program is slow.

The program's better features are those that make for true efficiency. For example, daily appointments are represented by bars on a time line. To change an appointment, you simply drag the bar. Shortening the bar shortens the appointment. Moving the whole bar shifts the hour of the appointment—without typing a single number. It's fast, uncomplicated, and actually easier than scribbling a new

time in an appointment book. Another convenience is the full-color, resizable, movable palette that makes it easy to move between Connections modules.

When I received Connections 2.0, it was afflicted with HyperTalk scripting errors that affected nearly every module. I received two patch disks within ten days and, after using them, continued to find bugs that needed mending. The patch disks fixed the problems, but installing them meant losing some data, such as alarms that had been scheduled prior to patching. Another glitch prevented me from printing directory reports on a StyleWriter. Concentrix acknowledged the bug, wrote a third patch disk, and sent it to me within a day. But the sluggish performance and the numerous bugs clearly indicate that the program needs refinement.

PowerTrax

POWERTRAX IS A MORE COMPLEX PROGRAM and is geared specifically to heavy business use. Though it shares many of Connections' directory and scheduling features, this sprawling 4D-based program (it runs best on 2.5MB of memory) is designed strictly for businesses tracking many clients, projects, and contacts.

At the core of PowerTrax is its elaborate

SUN	MON	TUE	WED	THU	FRI	SAT
			1 New Year's Day	2	3 10:00 File Summary	4
5	6 8:30 School Prog 11:00 Meet with 12:00 Lunch at C	7 9:00 NSR Confer 7:00 M4CC Board	8	9 9:00 Meet with St	10 10:00 Tour of Fac 1:00 Council Meet 4:00 Complete St	11
12	13	14 10:00 Meeting P	15 Martin Luther K	16 8:00 Leadership	17 8:00 Leadership	18
19	20	21	22	23	24	25
26	27	28	29 2:00 Board meet	30	31	

Monthly Calendar Each day contains a small rectangle to indicate the percentage of the day scheduled for appointments. Most-heavily-scheduled days appear with a black rectangle; lighter days, with a gray rectangle. A click in the middle of any calendar day produces an expanded view of the day's activities.

Type	Summary/Description	Start	End	Total
Presentation	Sale Committee	11:00 AM	1:00 PM	02:00
Appointment	Meet Fred	2:00 PM	3:00 PM	01:00
	Discuss new proposal with Fred			

The Big Picture The PowerTrax scheduler provides a one- or three-month view of your activities. In the three-month view dates containing scheduled events appear outlined. Selecting a date on the calendar produces a sortable listing of the day's events.

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rate contact database. You can store an enormous amount of demographic and biographical information about each contact. There are fields for three addresses; unlimited phone numbers; a spouse's name; children's names, ages, and hobbies; ethnic background; and so on. Check boxes let you specify if the contact is a smoker, drinker, or someone who objects to smoking. There are also up to 20 user-defined fields for inserting more information in each record. You can also store up to eight pages of notes in each contact file.

Once you've entered all this information, you can use it to sort the listings and perform elaborate searches. The contact database integrates with the program's other features quite well. If you've written a marketing plan using the Plan function, you can assign any of your contacts to the plan, and PowerTrax will begin monitoring the next steps that need to be taken with each individual contact.

The PowerTrax title screen features a sleek-looking monorail that streaks by as the program loads. The brief animated sequence is the only sensation of speed you'll experience—like Connections, PowerTrax slows you down when it should speed you up. Data entry processes are often convoluted and repetitive. For example, when you're filling in information on a new contact and you tab to the phone-number field, you can't just type in the number. You have to click on the Create icon to activate the phone field. And each additional phone number has to be created separately with still another click of the icon or an additional keyboard command. Also, there's no keyboard shortcut available to save a new event entry; you have to click on an icon and return to the main calendar screen to record each appointment. My gripe is that scheduling appointments and entering phone numbers should be much easier to do.

To make matters worse, the program has some irritating quirks. Scroll bars are sometimes activated unnecessarily. In pop-up windows, the scroll bars behave erratically, sometimes requiring two or three clicks before they respond. In numerous dialog boxes, the Select and OK buttons are highlighted but can't be triggered with the return key. And the otherwise extensive export facility doesn't let you export phone numbers. After discussing these and other problems with Soft Solutions, the company sent an update disk that fixed most of the obvious errors, but many of the ones listed above remain.

PowerTrax has its own full-featured word processor with mail merge capabilities; an excellent feature for designing and running telemarketing-type scripts; and an expense manager that allows you to track

spending by type, project, or period. A highly flexible report facility allows you to design and print custom reports. PowerTrax is not designed specifically for network use, but it can accommodate multiple users at each workstation, and you can view the schedules of each user individually or all of them simultaneously. A networkable version should be available by the time you read this. The program also comes with 4D Tools to check and repair damaged databases.

Companies needing this kind of contact management should wait for the program to get some much-needed polishing and streamlining before hopping on board.—JOSEPH SCHORR

Voice Recognition for the Macintosh

Voice Express

PROS: Easy to install; includes HyperCard XCMD.

CONS: Limited macro capabilities; voice files must be loaded manually. **COMPANY:** MacSema (503/757-1520). **REQUIRES:** Mac II.

LIST PRICE: \$399.95.



Voice Navigator II

PROS: Extensive macro capabilities; application-specific language files. **CONS:** SCSI device.

COMPANY: Articulate Systems (617/935-5656).

REQUIRES: Mac Plus; 2MB of RAM; hard drive; System 6.0. **LIST PRICE:** \$899.



VOICE EXPRESS AND VOICE NAVIGATOR II bring voice-control capabilities to the Mac. Both devices work by comparing incoming sounds with specific previously trained spoken commands, and true speech recognition on the desktop is still probably years away. What you can expect is hands-free operation in situations where manual control isn't practical or convenient.

Voice Express

INSTALLING MACSEMA'S VOICE EXPRESS is a snap: drop the board into any free NuBus slot, plug in the supplied headset mike, and you're ready to go. Voice Express lets you record words or phrases that trigger simple key sequences like shift-control-V. Unfortunately, you are limited to commands with keyboard equivalents, unless you have a macro utility like QuicKeys or Tempo.

Because Voice Express doesn't actually understand speech, you have to train it to recognize your voice by repeating

commands three times. Almost any sound will do, as long as it's 2½ seconds or shorter. The key is consistency: vary your inflection even slightly, and you'll have to begin the sequence again. It's especially important to avoid words that sound alike, like *style* and *file*. It's also wise to choose easily remembered commands that won't embarrass you. "Die, scum!" might seem like a cute way to turn off the office Mac, but "Shut down" is probably safer.

Voice Express uses disk-based files to save a user's speech patterns. Although voice files can store up to 999 commands, the NuBus board can store only 75 words. To get around this limitation, the Voice Express Advanced Editor lets you record instructions that load alternate groups of words onto the board. For example, you might place a word processor's style commands into a separate group. Command-swapping occurs almost instantaneously, but you have to plan carefully to avoid excessive switching between groups. I also found the editor's interface awkward to use for arranging commands into groups.

A few other quirks deserve mention. Voice files have to be loaded manually, and there's no way to automatically associate a set of voice commands with a particular application. Voice Express runs in the background under MultiFinder, sending macros to the active program. On the plus side, HyperCard hackers can add voice control directly to stacks using an XCMD that comes with Voice Express.

Voice Navigator

AS A STAND-ALONE SCSI DEVICE, VOICE NAVIGATOR has its pluses and minuses. For instance, it doesn't need a NuBus slot; but if you've ever wrestled with a mess of cables trying to get your computer to boot, you know SCSI is a mixed blessing. The AC power adapter is another nuisance.

Minor gripes aside, Voice Navigator II offers an impressively full-featured set of tools. The Voice Options control panel is used to set basic hardware and software preferences and load Voice Navigator files. Unlike Voice Express, which saves speech patterns and macros together, Voice Navigator places them in separate voice and language files. Voice files store a user's voice patterns; language files store program operations that you want to control by voice. Language files are application-specific and can be set to load automatically whenever you launch a program.

Voice Navigator's Language Maker desk accessory is used to create and customize language files. I like the feature that captures a list of an application's menus, including hierarchical and grayed-out items. Unlike Voice Express, Voice

continues

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Navigator does not limit you to menu selections with keyboard equivalents. Voice Navigator lets you specify voice commands for dialog boxes, tool palettes, mouse drags, and other special operations by using a built-in macro recorder.

Not surprisingly, mastering Voice Navigator's many features takes time and effort. The manuals are comprehensive and include a section on how to give voice-operated demos. The only notable deficiency is that the tutorials use real-world applications as examples; unless you already own the programs, all you can do is read along. Future updates should include a functioning tutorial program.

Is Talk Cheap?

BELIEVE IT OR NOT, ALL THIS STUFF actually works well, within the limitations of the technology. In a quiet room, both Voice Express and Voice Navigator did a good job of recognizing my commands. Background noise (courtesy of my three-month-old daughter) noticeably degraded the correct response rate, although a noise-canceling mike might have helped. Between the two products, I recommend Voice Navigator because of its more complete feature set. Provided you have a macro utility, Voice Express is a good option if you're on a budget.

The real question, folks, is whether operating the Mac by voice is a luxury or a necessity. If you need an extra free hand or two, voice control can be a godsend. But until intelligent speech recognition is available, I'm sticking with the keyboard and mouse.—FRANKLIN TESSLER

Income Tax Software

MacInTax 1991

PROS: 30-day money-back guarantee; WYSIWYG forms; quick data entry. **CONS:** Redundant help systems; too much IRS jargon. **COMPANY:** ChipSoft (619/453-8722). **REQUIRES:** Mac Plus; hard drive. **LIST PRICE:** \$99.95.



HyperTax Tutor

PROS: Down-to-earth language. **CONS:** Not intuitive or easy to use; no documentation. **COMPANY:** SoftStream International (508/991-4011). **REQUIRES:** Mac Plus; hard drive; System 6.0.4. **LIST PRICE:** \$99.00.



TAXES KEEP GETTING MORE and more complicated. The rules are obscure (and will never be-

MacInTax Form The status bar at the top of the main window includes information about the current field and a series of help and information buttons.

HyperTax Text The main window includes various navigation buttons to help you find the information you want.

come clearer), the amount you pay gets larger and larger, and automated tax-preparation assistance never seems to simplify the process. And because the IRS doesn't finalize its forms until sometime in the first quarter of the new year, it's difficult for tax software companies to release timely upgrades. Many tax software vendors are now selling preliminary, early bird versions that include a free upgrade to the final version when that becomes available.

MacInTax

MACINTAX IS AN ESTABLISHED, AWARD-winning program for preparing IRS-ready tax returns. MacInTax makes it as easy as possible, presenting on-screen replicas of the actual IRS forms. Data entry is easy, and the completed forms can be sent directly to the IRS by mail or electronically (not available in the early bird version). The program asks a series of questions about your finances, directs you to the proper forms, tells you what to fill in, and explains the next step.

If you don't know the exact amount for a data field, the program permits you to enter an estimate or say you don't know. It computes the return based on the information it has, flagging estimated or incomplete values. The program calculates most values automatically, carrying amounts over to other forms and schedules where necessary. You can *itemize* (not to be confused with the IRS term) a particular data field, and MacInTax adds the individual amounts for you. The pro-

gram comes with its own worksheets and schedules to assist you with organizing your data.

MacInTax's extensive help systems include line-specific help for any line of any form; a description of all the menu functions; a context-specific Consult button; and a Help menu that includes a tax filing calendar, tax strategies, and a description of tax law changes. Overall, there are too many redundant techniques, and since most of the help text comes from IRS documents, it tends to be unclear and confusing.

The early bird version includes about 20 key forms and schedules including 1040, 1040A, 1040EZ, and Schedules A, B, C, D, and F. The final version will include about 20 additional forms. ChipSoft also offers Taxview Professional, a separate program, designed specifically for professional tax preparers.

MacInTax, in spite of its modest flaws, is the best Macintosh tax program available—provided your tax return is uncomplicated.

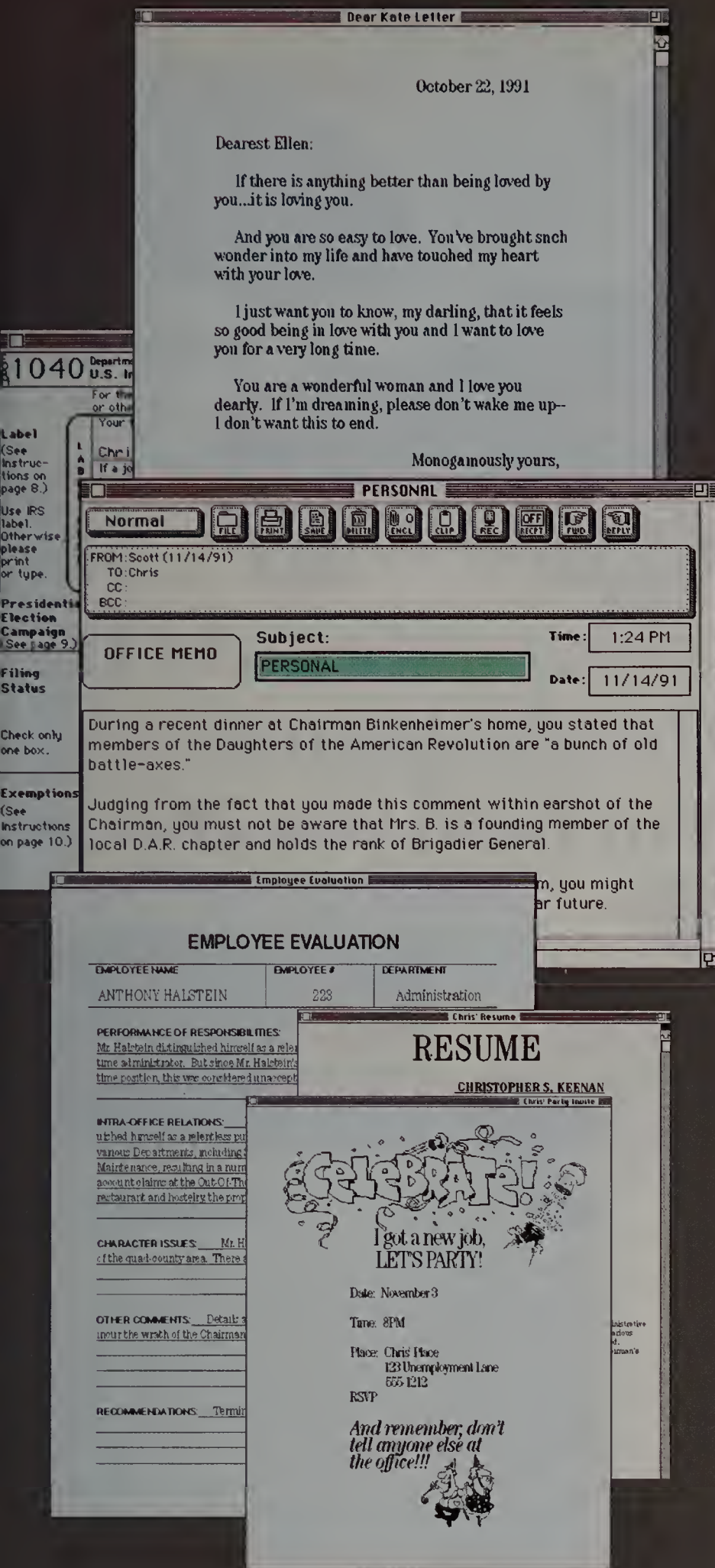
HyperTax Tutor

HYPERTAX TUTOR, DESCRIBED AS A support tool for people working with MacInTax, is a cross-referenced version of a book containing extensive tax explanations, strategies, and examples written by professional income tax preparer Dennis Kamensky. You can either browse the information sequentially or use the index, the table of contents, a related-topics function, a topic index, a random search function, or the extensive glossary. The program includes a good keyword search function and an exhaustive, annotated index of IRS forms. HyperTax Tutor also makes a commendable effort to reduce IRS jargon.

Unfortunately, the program is neither intuitive nor easy to use. First of all, there's no clear path between sections. The introductory page shows three main sections—contents, book, and index. As you start using HyperTax Tutor, however, you find commands for related topics, a topic index, bookmarks, searching, a backtracking list, and many other ways of examining the data.

There are other problems with the program's design. You can resize and move some windows but not others; some windows have buttons, some don't; sometimes apparently active buttons and commands do nothing. A single set of well-designed controls would be much better. Finally, the help system is slow.

HyperTax Tutor can help you understand some of the more complex IRS tax laws if you're willing to put up with a second-rate design.—STEVE MANN



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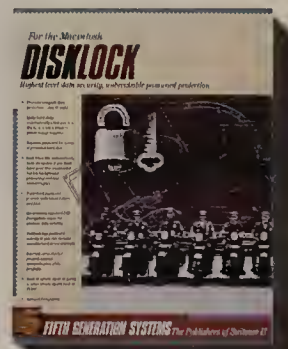
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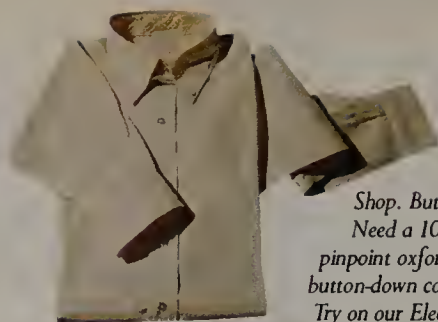
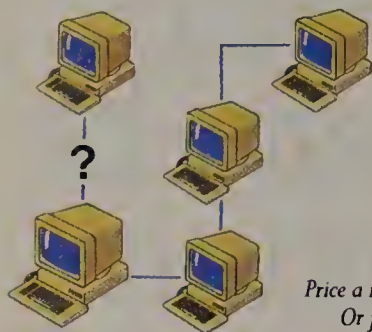
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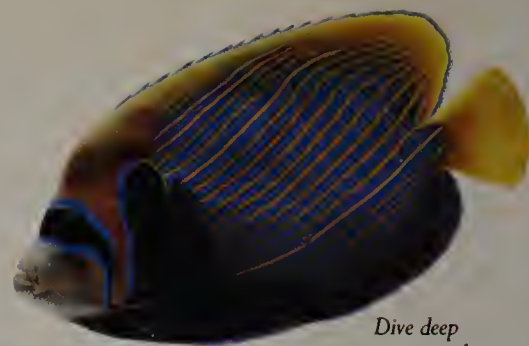
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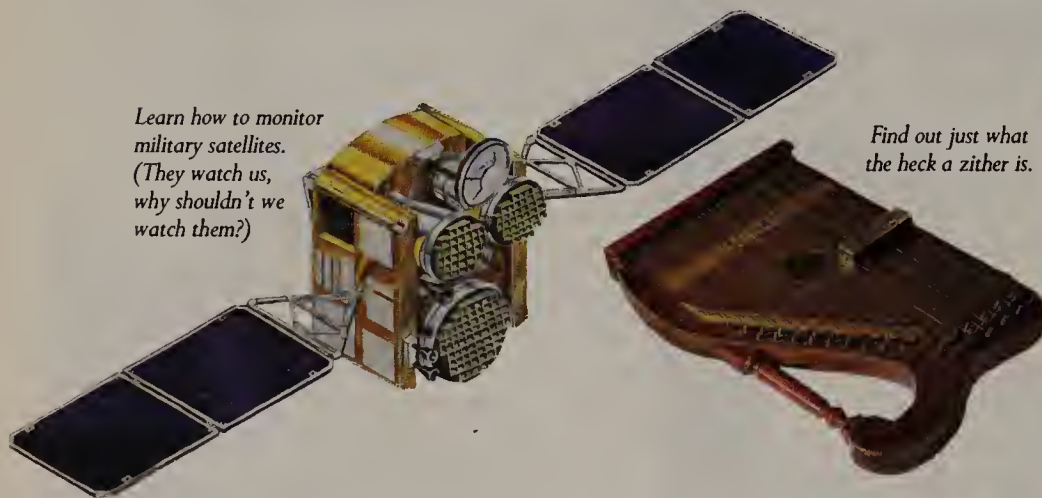
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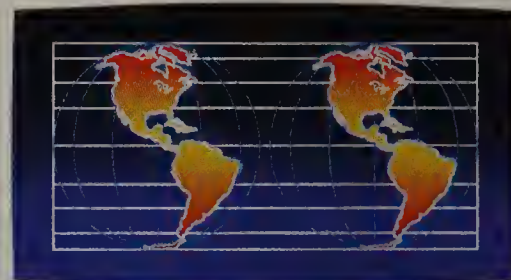


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Volume 1: Classic Art**PROS:** Intuitive interface; fine documentation.**CONS:** No online help; many filters are disappointing.**COMPANY:** Silicon Beach Software (619/695-6956). **REQUIRES:** Mac II; 2MB of RAM; System 6.0.5; QuickDraw 1.2. **LIST PRICE:** \$199.

ALDUS GALLERY EFFECTS IS A collection of 16 image-editing filters for use with Adobe Photoshop, Aldus SuperPaint, and Aldus Digital Darkroom, plus four applications that let you apply the Gallery Effects. The applications include a stand-alone program and a DA that enable users to apply one of the SuperPaint filters to any graphics stored in the PICT or TIFF format, from black-and-white to 24-bit color. Another program, Animator, lets you apply a filter to one or more frames of a PICS file, or batch process an entire folder of PICT images. An XCMD enables developers to access Gallery Effects filters from inside HyperCard.

The heart and soul of the package are the Classic Art filters themselves. Regardless

of the program from which you apply a filter, a single, standard dialog box displays the available options and a preview window, which lets you test the effect on a small portion of the selected image. You can save filter settings to disk, and later retrieve them from a pop-up menu.

The Gallery Effects manual is unusually strong. Although neither the applications nor the filters support any online help, the manual makes up for the lack with color illustrations and detailed explanations. Most enlightening is the discussion of techniques and real-world applications.

Unfortunately, the collection is weak on substance. Some of the filters are already built into Photoshop and ColorStudio. Others are just uninspiring or fail to measure up to their names. Fresco, for example, leaves an image dark and gooey, hardly suggestive of the technique for which it is named. Most disappointing is Chrome. It's not that the affected image doesn't look like chrome, it's just that whatever you start with, you end up with an unrecognizable mess.

On the other hand, Watercolor and Dry Brush illustrate what the Classic Art collection could be if it were better planned. These both embellish scanned photographs with painterly highlights. Better yet, these are filters graphic artists might actually find themselves calling on more than once.

Though the effects are well docu-



A Cat for All Seasons Clockwise from the original image (upper left): Chalk & Charcoal, Mosaic, Dry Brush, Poster Edges, Ripple, Watercolor, and Chrome.

mented, I'm still not sure precisely what purpose this collection of filters is supposed to serve. Gallery Effects is a fun way to waste an afternoon, but I wouldn't waste money on it.—DEKE MCCLELLAND

Apple Menu Enhancer

HAM 1.0

PROS: Remembers recently used files, folders, applications; can reorder or hide items in Apple menu; clean design; no known compatibility conflicts.**CONS:** Permits only limited editing of HAMlets.**COMPANY:** Microseeds Publishing (813/882-8635). **REQUIRES:** Mac Plus; 2MB of RAM; System 7. **LIST PRICE:** \$99.

IN AN ERA WHEN MOST MAC SOFTWARE is afflicted with chronic featuritis, it's a relief to find a utility that performs just one simple function with grace and intelligence. The utility is HAM (Hierarchical Apple Menu), and its function is to enhance System 7's Apple menu. With System 7, the Apple menu can list almost anything and perform a wide variety of functions. But it can also easily become cluttered and confusing. HAM makes the Apple menu more useful and easier to use.

HAM's most obvious improvement is the addition of submenus to all the folders listed in the Apple menu; folders within submenus also acquire submenus (to a maximum depth of five folders). For example, HAM appends to the Control Panels menu

item a submenu listing all the control panel files; you simply select a file listed in the submenu to open the corresponding control panel. Access is similarly enhanced for the items in any folders (or folder aliases) you add to the Apple menu, such as an Applications folder filled with aliases of your favorite programs.

To prevent a terminal case of over-hierarchicalization and save RAM (HAM consumes RAM in direct proportion to the number and size of the submenus it creates), HAM lets you turn unwanted submenus off (and back on). You can also list the items in the Apple menu in any order and hide items you don't need—all without altering the contents of the Apple Menu Items folder.

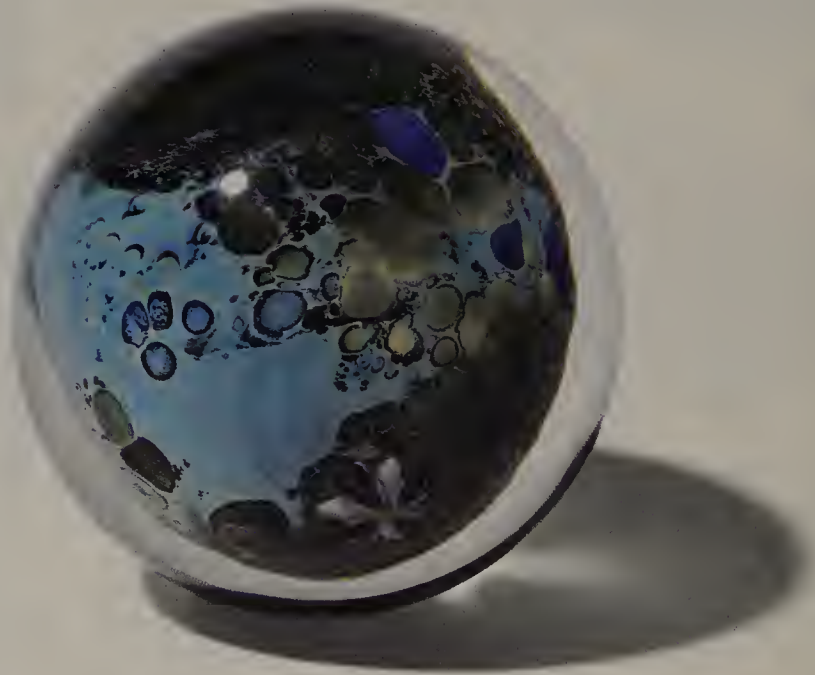
HAM also keeps track of the files, applications, folders, and servers you've used most recently and lists them in separate submenus under a Recent Items folder, which it adds to the Apple menu. You specify the number of items HAM should remember in each category, from zero (which eliminates a submenu from its memory) to 99. Then, to return easily to a recently opened file or launch a recently used program, you select the item from the Recent Items submenu.

Finally, HAM can record frequently used combinations of applications and documents in *HAMlets*. HAM creates a HAMlet by taking a snapshot of all currently open programs and files. You can modify a HAM-

let before saving it by deleting unwanted items; you cannot, however, add items that are not currently open or modify the HAMlet once it's saved. To open all the items it records, you simply double-click on the HAMlet icon (or select it from the Apple menu if you've placed the icon there). In addition, HAM will remember (via a special HAMlet) all the applications and documents open at shutdown and reopen them when you turn on the Mac.

Although their methods differ, HAM, HandOff II (Connectix, \$99), and OnCue II (Icom Simulations, \$99.95) all provide quick access to even the most deeply buried files, folders, and applications. Feature for feature, HAM is outclassed by HandOff II and OnCue II, both of which cover several bases in addition to file and application access, yet cost the same. Of the three programs, however, HAM is the best designed and easiest to learn and use. Only HAM provides a simple way to reorganize the Apple menu and allows you to start in the morning exactly where you left off the night before. And although I can't guarantee that it's bug-free, HAM is the only one of the three that never crashed during my tests. Thus, if you're looking primarily to improve file and application access, want to reorganize the Apple menu, and want a low learning curve and few hassles, then I definitely recommend HAM.—ROBERT C. ECKHARDT

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Graphical-Data-Analysis Software

PEMD Discovery 1.3.1

PROS: Simple to learn and use; good Mac interface; data available on CD ROM. **CONS:** Unsophisticated data-search and -retrieval routines; limited displays; no analysis capability; weak manual.

COMPANY: PEMD Education Group (707/894-3668). **REQUIRES:** Data-analysis software;

Mac Plus; System 6.0. Data stacks: CD ROM player; System 6.0.5 and HyperCard (both provided).

LIST PRICE: \$189 (\$89 to educational institutions); data stacks on CD ROM each \$149.



NOWADAYS, BUSINESS MANAGERS need lots of data and the marketplace is responding. Online services offer access to enormous data resources, and mail-order dealers sell encyclopedias on CD ROM discs. This data blizzard creates two problems: access, how to find the numbers you want; and analysis, how to convert them into useful information. PEMD Discovery tries to address both issues. Unfortunately, it's weak on both counts.

Discovery's two-step approach requires first using HyperCard to index and browse data files. Then you select a data set and move it to Discovery, which draws line

graphs to help you explore meanings and expose relationships. The PEMD Education Group also publishes CD ROMs—such as U.S. Economic Data and Environmental Data—with the data already in Discovery's HyperCard format. You can also import data from a tab-delimited text file.

Each data set is organized according to one independent variable, usually time. Data are also classified by nonnumeric categories (called *items*). Each dependent variable (such as population) is recorded for each item (such as country) for each time period. Data sets are limited to 26 dependent variables of 400 time points in each of 8 items.

Each data set is kept in a HyperCard stack. For managing large data libraries such as CD ROMs, Discovery provides a HyperCard script that builds an index based on a one-word search, subject to HyperCard's limitations: you can't narrow a search by requesting multiple words, using AND and OR operators, or by excluding fields.

Data sets can be converted to a Discovery file for display as line graphs. You can place any variable on the *x* or *y* axis and draw multiple curves—one for each item—on a single plot. Discovery handles missing values correctly, and enables you to make data summaries and projections (by returning to HyperCard). You can highlight and color each curve, scale the axes, and superimpose marker lines or a diagonal. Discovery graphs

can be printed, copied to the Clipboard, or saved in PICT format.

Discovery does what it's supposed to do—organize numeric data files and draw line graphs. It's easy to learn and has a real Mac look-and-feel. But you can't change the fonts or other display features, nor can you add labels and legends to graphs. Moreover, I don't see much need for the graphics portion of Discovery. Excel produces all the same analyses, projections, and graphs—more easily and flexibly—without your having to switch into and out of HyperCard.

A more serious reservation about Discovery is that converting data into usable information is hard to do well. The best set of techniques for the purpose is Exploratory Data Analysis (EDA), an approach that lets you work intuitively—sometimes forming hypotheses and testing them out, sometimes being led to new hypotheses by the data. Computer support for this process requires a rich graphic and analytic environment—color and 3-D, the ability to rapidly transform and reanalyze data, and good documentation, none of which Discovery has, not even the capability to construct a histogram or plot on log axes. Without a proper set of tools and a manual that teaches something about data exploration, Discovery will likely lead business analysts to some incorrect—and potentially expensive—conclusions.—PHILIP STEIN

Backup Utility

DiskFit Pro

PROS: Easy to use; stores data in Finder format; good media management. **CONS:** Doesn't support tape drives. **COMPANY:** Dantz Development Corporation (415/849-0293). **REQUIRES:** Mac Plus; System 6.0; hard drive. **LIST PRICE:** \$125.



ROOT CANALS, IRS AUDITS, HARD drive backups—these are a few of my least-favorite things. While it doesn't do anything about your teeth or taxes, DiskFit Pro, a simple and effective backup utility from Dantz Development, makes the chore of protecting hard drive data if not enjoyable, at least bearable.

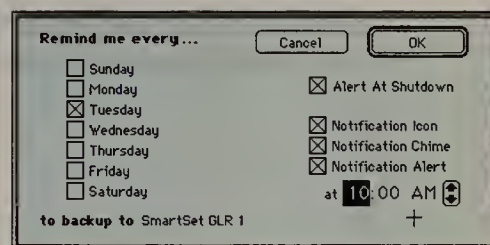
You begin with a full backup, and for this you'd better drag the Mac into the living room and turn on the TV. Backing up 36MB of data took 2 hours and 10 minutes and gobbled up 47 of my 800K disks. (Hint: Use a 64K RAM cache to hurry things along.) DiskFit Pro can run under Multi-Finder, but why bother? It's intrusive, doesn't allow you to move any files during backup, and slows down the foreground application; best just to grin and bear it.

After completing a full backup, you have

a SmartSet (a stack of backup floppies), and from here on, incremental backups are simple and speedy. DiskFit Pro stamps each disk in the set with an information file and then compiles this data from all backup disks into one catalog (which you can print or view on screen). Having catalog information on each backup floppy means that DiskFit Pro can restore files even if the lead disk (or any other disk in the set) is lost. The program reliably removes deleted files from the backup set and reclaims the space, keeping the SmartSet up-to-date.

DiskFit Pro writes all the data in Finder format, so file retrieval is as easy as dragging backup files to the hard drive. However, this also makes for relatively slow backups, and DiskFit Pro provides no file compression. According to Dantz, DiskFit Pro can split very large files (up to 200 gigabytes) and automatically join them during a restore.

The program offers a nice array of customizing features. You can exclude files and folders from backup, use aliases, and maintain access privileges; the program also recognizes subvolumes, permitting backups to or from selected portions of a drive or cartridge. DiskFit Pro works with any Finder-mountable media, including removable cartridges, hard drives, optical disks, and 3½-inch floppies; and you can back up to a combination of media. DiskFit Pro does not support tape drives (for this Dantz recom-



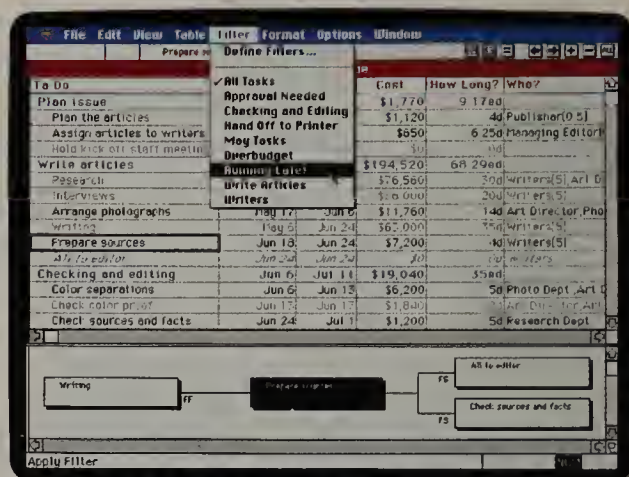
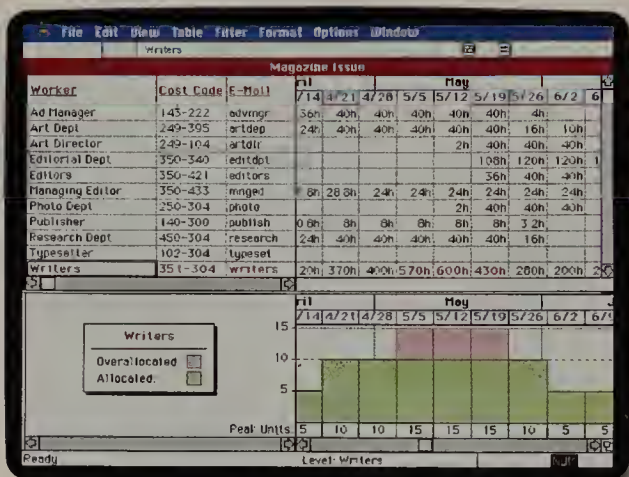
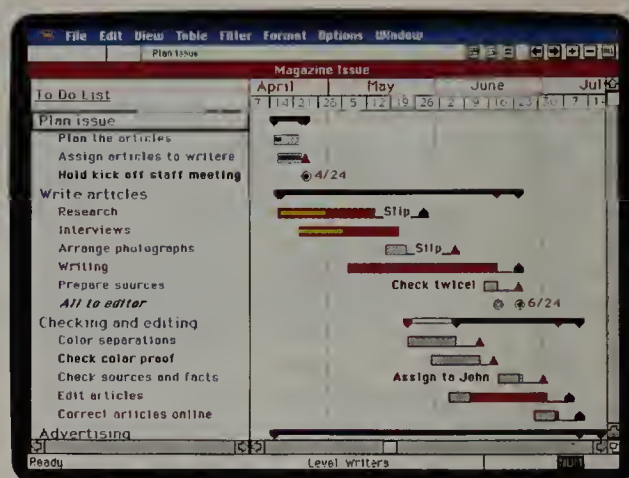
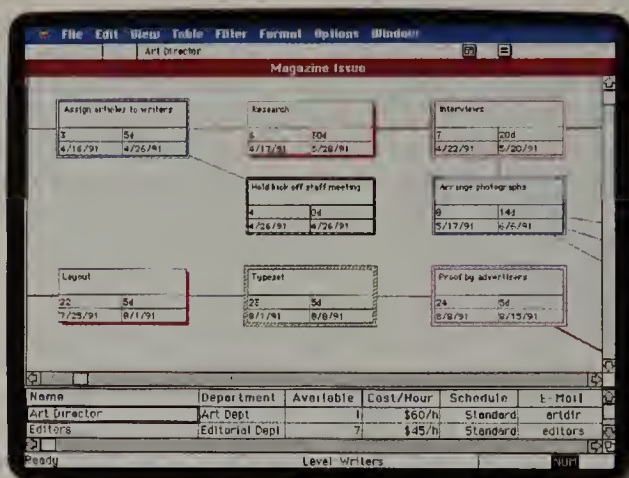
DiskFit Reminder DiskFit Pro's handy Control Panel Reminder lets you schedule regular backups, but its options are limited.

mends its Retrospect and Retrospect Remote programs), but it's possible to perform unattended backups and shutdowns. If you run out of disks or time during a backup, the program lets you pick up where you left off.

The DiskFit Pro Reminder, which runs under the Control Panel, lets you schedule a series of alarms to warn you when it's time to back up. However, it only allows you to specify day of the week and time; I would have liked the option of biweekly or even monthly backups.

DiskFit Pro does exactly what it claims: it makes backing up easy. But what it doesn't do is outperform the HFS Backup utility that came free with my MacBottom hard drive. DiskFit Pro is faster, more flexible, and smarter, but for the plain-Jane backups I do, DiskFit Pro does not add enough features to justify purchasing a second backup program.—GEORGE L. REYNOLDS

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Screen-Sharing Utility

Carbon Copy Mac 2.0

PROS: Inexpensive; compressed-file data transfer.

CONS: Hefty start-up INIT (extension); sluggish on low-memory Macs. **COMPANY:** Microcom (617/ 762-9310). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** Single user \$99; unlimited users \$299.



AS A NETWORK ADMINISTRATOR, I've always wished that the click of a button could bring me face to face with a user's dilemma. No more trudging up three flights of stairs and through a maze of cubicles to find out why a printer isn't responding or how an E-mail message from Zone 1 got lost in the ozone. I've considered Farallon's Timbuktu Remote for these kinds of support quandaries, but multiplying its per-node price tag of \$195 by my 100 or so nodes, this solution remains in the realm of fantasy. With Microcom's Carbon Copy Mac at \$299 for an unlimited number of users per AppleTalk zone, the fantasy comes much closer to reality, but the utility's shortcomings still leave me wishing for the perfect remote-access utility.

Carbon Copy Mac works as an INIT and a DA. The INIT loads at start-up and lets you use the DA either to designate your machine as a host for other Macs or to control other Macs from yours. Guests who have been given a password are allowed access to the host computer and may view, manipulate, and swap files with that system. The INIT part of the team takes a whopping 256K of System memory to start up (that's a lot on a 2.5MB Mac Plus) and hogs it the entire time the computer is running.

Carbon Copy Mac is a valuable asset in some areas and a genuine pain in others. It's most efficient controlling unattended machines such as file servers and mail centers, and for an occasional file transfer. In addition to its low price, Carbon Copy Mac's other advantages over Timbuktu Remote are its ability to compress data and to scan for viruses during transfer. Efficiency degrades somewhat when Carbon Copy Mac is used to control attended Macintoshes, because it must compete for RAM with applications, screen savers, and E-mail. Users who have several applications running will experience slowdowns because Carbon Copy Mac competes for RAM. Carbon Copy Mac also comes in handy for the occasional small file transfer.

What caused me the most frustration was the remote control of a low-memory machine—in this case, a 2.5MB Mac Plus.



Backseat Driver Carbon Copy Mac is most efficient when running on file servers or mail centers.

Moving the cursor to control applications was like trying to do the Watusi in a pool of quicksand. It took 30 to 45 seconds from the time I moved the cursor or selected an item to the time the action registered on my screen.

Carbon Copy Mac has great potential. The price is right, and when given 4MB or more of RAM in which to operate, it compares favorably to Timbuktu. In other situations it's a convenient and economical utility for occasional use. However, I cannot recommend it as a global solution to remote-control support. It's simply not efficient enough for that yet. If future versions bring speedier performance and support for color Macs, Carbon Copy Mac may give Timbuktu Remote a run for its money.

—MATTHEW R. CLARK

24-Bit Flatbed Scanner

Mirror 600 Color Scanner

PROS: Fast and accurate; inexpensive; excels at scanning textured surfaces; includes Adobe Photoshop 2.0. **CONS:** Counterintuitive contrast, brightness, and color-balance controls. **COMPANY:** Mirror Technologies (612/633-4450). **REQUIRES:** Mac Plus; Mac II with 2MB of RAM for color; 4MB of RAM for Photoshop. **LIST PRICE:** \$1299.



WHAT DO YOU GET WHEN YOU cross the Umax UC630 scanner engine (list price \$1995), Adobe Photoshop 2.0 (list price \$895), and a \$1299 price tag? The Mirror 600 Color Scanner, the best-priced scanner in its class.

Physically, the Mirror 600 has much in common with the \$1295 Howtek Personal Color Scanner. Both are three-pass scanners (one pass each for the red, green, and blue primary-color channels), both offer scan areas of 8½ inches by 14 inches (larger than the more expensive Sharp JX-300 or La Cie Silverscanner), and both provide 600-dots-per-inch vertical and 300-dpi horizontal resolution. (With software interpolation, the

horizontal resolution can be 600 dpi.)

The Howtek model has slow scanning speed, frequently inaccurate color balance, and problems with color registration, while the Mirror 600 is fast and precise. Using default settings, I was consistently able to capture true colors and adequate color contrast. And even though the degree of detail and focus was sometimes lower than I preferred, this was easily remedied using Photoshop's Sharpen filters and Unsharp mask.

The Mirror 600 also excels in scanning textured objects; most flatbed scanners encounter focus and registration problems with anything that's not flat. Reflective surfaces such as coins are particularly troublesome. Since the light source moves with the scanning sensor, light can reflect differently on different passes, creating inconsistent highlights and shadows. When I scanned a quarter at 600 dpi, the Mirror 600 produced an almost entirely consistent scan. The only problem: the red channel was slightly out of register. I had to nudge it down a single pixel to produce an exact color fit.

The Mirror 600's only liability is its software. The scanner ships with a plug-in driver for Photoshop 2.0 and the MirrorScan utility and DA. Each program has its own interface, but the resolution, scale, and scanning mode options are easy to use.

Unfortunately, both brightness and contrast are approached oddly. When you

scan in 24-bit color, the Photoshop plug-in requires that you specify Highlight and Shadow values for each of the three color channels. Values range from 0 to 50 (0 to 50 what?), must be chosen from 5-inch-long pop-up menus (yes, I measured them), and are poorly explained in the manual. The MirrorScan utility is marginally better, offering a variation on the color-balance curve. But the variation is flawed: you can only increase contrast, not decrease it. And because you can only adjust how the scanner responds to white, black, and 50 percent saturation levels, you cannot specify the kind of complex transfer functions needed to compensate for less-than-perfect originals.

And there are quirks. The MirrorScan utility features two options that look like entry boxes, but when you click on them they change to pop-up menus, complete with drop shadows. But my favorites are the four Photoshop plug-in Operations options; three of them are constantly dimmed. The manual says only: "These controls are inactive (they're for gray-scale scanners)." Ah, the old options-with-no-purpose approach.

But as long as your original artwork is up to snuff, the Mirror 600 will match it beautifully without adjustments. And while scanner prices continue to fall, a street price of under \$1000 currently makes the Mirror 600 the best value around.

—DEKE MCCLELLAND

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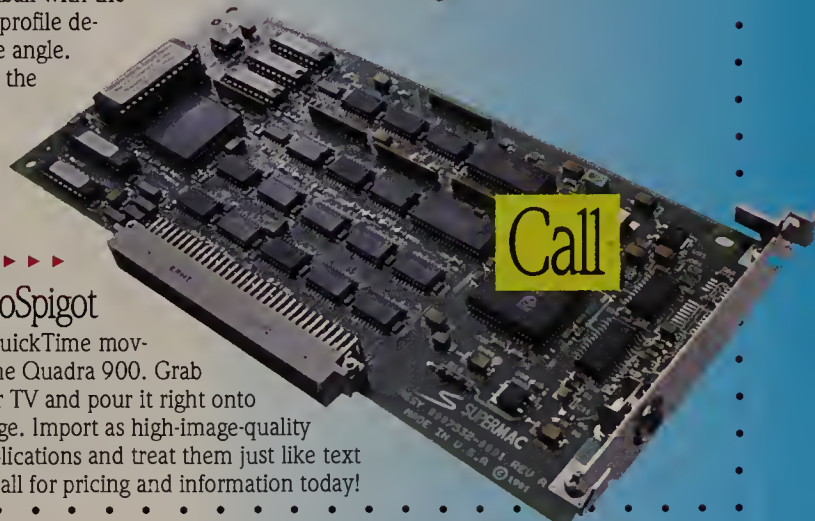
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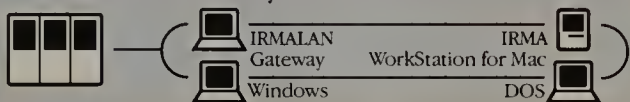
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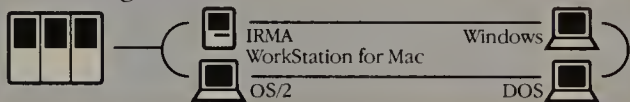
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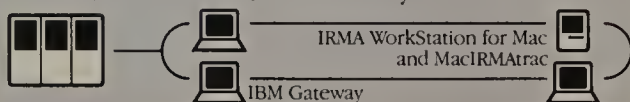
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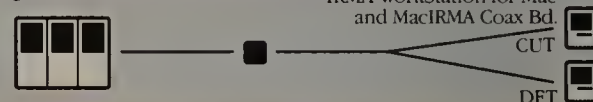
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Atlas Software

MacGlobe 1.0

PROS: Complete database of maps and demographics; quick; easy to use. **CONS:** Maps could be more colorful and more fully illustrated.

COMPANY: PC Globe (602/730-9000).

REQUIRES: Mac Plus; System 6.0.4; hard drive.

LIST PRICE: \$79.95.



World Atlas 1.2

PROS: Colorful, informative maps; easy-to-read text. **CONS:** Requires 7MB of hard drive space.

COMPANY: Software Toolworks (415/883-3000).

REQUIRES: Mac Plus; System 6.0.2; hard drive.

LIST PRICE: Disk \$79.95; CD ROM \$89.95.



IF YOU'RE A LITTLE HAZY ABOUT world geography and cultures, pick up PC Globe's MacGlobe or Software Toolworks' World Atlas. Both include extensive maps and demographic facts and figures. Can't find Mozambique on a map? Either package can quickly point it out for you. Want to know the literacy rate in Tibet? You can call up the answer in seconds.

Both Mac atlases contain more than 200 maps of countries and regions of the world. Each package starts you off with a map of the world—click on a particular spot, and the program produces a map of the country you've selected. Country maps show capitals and other major cities, population centers, elevation, terrain, and so on.

MacGlobe isn't deficient in its maps, but World Atlas provides a more detailed view of the world, offering maps of geographical regions, whereas MacGlobe has only country maps. What's more, World Atlas's maps offer more detail—more cities, ports, and other landmarks. The maps also show a country's position relative to other countries, so you can see where Kuwait borders Iraq, or see that tiny Liechtenstein is landlocked by Austria and Switzerland.

MacGlobe and World Atlas also offer a vast amount of demographic information. You can dig up dozens, if not hundreds, of facts and figures about a given country—gross national product, cash crops and industries, agricultural production, education expenditures, literacy levels, crime rates, population growth, ethnic composition, language and religion, and so on. Each program also features its own set of unique demographics. For instance, World Atlas lists average daily calorie consumption per capita, the number of practicing dentists, and total number of televisions installed in

a country. MacGlobe, for its part, offers international telephone area codes, and even travel tips (dress conservatively if you visit Iraq, and avoid tap water and salads when in Leningrad—oops, Saint Petersburg).

MacGlobe packages much of its data in the form of charts, while World Atlas reports in plain text with descriptive headings. Personally, I prefer World Atlas's textual approach. On the other hand, MacGlobe's interface and its slight edge in speed make it more convenient for comparing demographics from one country to the next—for instance, to check the United States' unemployment compared to Japan's.

All this information, by the way, is compiled from various databases; international agencies such as the United Nations, World Health Organization, and United States Department of State; and commercial reference works such as the *World Fact Book* and *Encyclopedia Britannica*. PC Globe plans to offer annual updates to MacGlobe; Software Toolworks hasn't set a definitive schedule yet but also plans to release data updates.

Before making your choice between these two atlases, consider each program's hard drive requirements. MacGlobe limits itself to 2.5MB, while the World Atlas hogs a whopping 7MB. This issue aside, however, you'll be well served by either package. Both are broad in their coverage, interesting to explore, and inexpensive.—HELMUT KOBLER

Slide Scanner

RasterOps Expresso
Personal Slide Scanner

PROS: Fast; easy to use. **CONS:** Poor-quality scans. **COMPANY:** RasterOps Corporation (408/562-4200). **REQUIRES:** Video digitizer or video display board with frame-capture capability.

LIST PRICE: \$999.



THE RASTEROPS EXPRESSO ISN'T a scanner in the usual sense of the word. Also, it's not really made by RasterOps, and it's not really new. However, if you need to scan 35mm slides or negatives into your computer (or transfer them to videotape) and can live with less-than-stellar image quality, the Expresso is a fast, convenient, and economical way to go.

The Expresso, made by Tamron, has been sold in photographic and video circles for years under the name Photovix III. Unlike typical slide scanners, which produce a digital image, the Expresso outputs standard NTSC video. Essentially, this "scanner" is a video camera that's permanently mounted above an illuminated stage. To get the Expresso's video signal into your Mac, you

need a digitizing board (a so-called frame grabber) or a video display board with a frame-grabbing function.

While the Expresso—even including the price of a frame grabber—*can* be an inexpensive scanning solution, its real strength is ease of use. Its simple, manual controls can capture images about as fast as you can feed in slides. To capture an image, you slip a slide into the image stage and then bring up the video signal on the Mac using the frame grabber's capture program. Adjusting the picture is easy, since the screen image reflects adjustments as you make them. You focus the Expresso as you would any camera and balance color just as you would on a TV. Aperture and zoom levers let you set brightness or magnify the image up to three times. When the image looks the way you want it to, just save a file to disk.

Flicking a switch on the Expresso inverts the color values of the video picture, enabling you to work with negatives as well as slides. Since the Expresso outputs standard video, you can plug it straight into a TV or VCR. Multimedia types will find the Expresso handy for transferring stills to video, and photographers could use it as a quick way to preview negatives.

The slides looked fine on TV. On the Mac, the files I captured using a RasterOps 24STV board were pretty unimpressive. Blurriness was the most obvious problem.

The Expresso is capable of a total resolution of 640 by 480 pixels (the size of an Apple 13-inch monitor). With the 24STV, however, its actual resolving power was somewhat less than that, since the scans were dithered. The color response was also poor, with a much smaller range of shades available in the Mac scans than on TV.

Exactly how much your scans suffer in the analog-to-digital conversion depends on the capture board you use. The best file you can produce using the Expresso, however, will look worse than output from the worst 24-bit standard flatbed or slide scanner. If your images are small and you're not fussy, you could probably use the Expresso for print publishing or on-screen presentations. But in general, the Expresso is for people who work with a lot of slides, need to work quickly, and use scans as representations rather than for presentation. It's perfect for designers who use color scans on screen during the design process, for example.

Tamron says the Expresso is identical to the Photovix III, so buy the device you can make the best deal on. Also, if you like the idea of a video scanner but find the Expresso or the Photovix III too limited, look at Tamron's Photovix II-X (\$1899), which accepts transparencies larger than 35mm, can pivot to shoot three-dimensional scenes and reflective art, and offers better optics and more color control.—JOE MATAZZONI

Event-Reminder Utility

First Things First 2.0

PROS: On-screen clock floats over windows, can be positioned anywhere; reminder function is easy to use. **CONS:** Disorganized manual; can't export data to other programs. **COMPANY:** Visionary Software (503/246-6200). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** \$69.95.



THE FIRST THING YOU NOTICE about First Things First (FTF), the event reminder/clock from Visionary Software, is the nifty on-screen clock. Like Now Software's AlarmsClock (part of Now Utilities), FTF can display a digital clock anywhere in the menu bar, in any color; a click on the clock temporarily displays the date. But unlike either AlarmsClock or CE Software's Alarming Events (which has no on-screen clock), FTF can display the digital clock, or an expanded clock showing date and time at once, anywhere on the screen. Both clocks float serenely above your windows and, if you want, chime on the hour. In a few programs, including Microsoft Word, the free-floating clock causes cosmetic display problems with the window underneath.

FTF also handles event reminders and to-do lists. One-time or recurring reminders generate timed, on-screen alerts. You set recurring reminders to go off every so many minutes, hours, days, months, or years—or to go off some day each month by choosing a day with the one-month minicalendar. (Unlike AlarmsClock, FTF makes no distinction between weekdays and weekend days in recurring daily reminders.) Things to do can be associated with a specific time and date but do not generate alarms.

Reminders and things to do are created and listed in the main FTF window. You can have the window show only reminders, only recurring reminders, only things to do, or all three. You can assign reminders and things to do to user-defined categories, such as a project (like a quarterly report) or a type of event (birthdays, say); in the main window, you can list only the items in a specific category, or those in all categories. Things to do can be assigned one of four priorities, and you can view one, several, or all priority levels. For the categories and items requested, you can display all items, all uncompleted items, or the items due today, this week, or during the coming month or a specified time period. Procrastinators can list overdue items only, while the well-organized can smugly view a list of completed items. Regardless of display choices, items are organized by date and time or priority. You can

print the list as it appears on screen or in a specified font or size. Unlike Alarming Events, FTF has no Import or Export commands for sending the data to a calendar, database, or project-management program.

All reminders are announced with a user-selected alarm and a flashing icon. (Disconcertingly, FTF freezes the Mac for several seconds before and after the alarm.) Unlike AlarmsClock and Alarming Events, which can display the text of the reminder when the alarm goes off, FTF requires you to double-click on the alarm icon to read the reminder's message; and only then can you turn off the alarm or reset it for any later time (in contrast to AlarmsClock, which offers only a single, preset snooze interval).

You probably won't mind that FTF lacks AlarmsClock's stopwatch function; but you may wish FTF offered the extended calendar views and advance notification that make scheduling in Alarming Events so convenient. FTF is very easy to use, however, even if its manual is not. These and other minor flaws aside, First Things First is a good, basic reminder program with a great on-screen clock. Except for those who need (each at nearly twice the price) AlarmsClock's companion utilities or Alarming Events' calendar views and advance warnings, First Things First is my first choice for wake-up calls of all kinds.

—ROBERT C. ECKHARDT

Simulation Game

SimAnt 1.0

PROS: Clever animation and sound effects; teaches user about ant behavior. **CONS:** None. **COMPANY:** Maxis Software (510/254-9700). **REQUIRES:** Mac Plus (SE/30 for color); 1MB of RAM (2MB for color); System 6.0.2. **LIST PRICE:** \$59.95.



WHAT CAN YOU SAY ABOUT A 20-minute-old ant who died? Sure, she was only a simulated ant, but she was my ant, and I'm going to miss little Emily.

Emily was a diligent worker ant created by SimAnt, the latest offering from Maxis Software (of SimCity and SimEarth fame). One of the first lessons SimAnt teaches is not to become sentimentally attached to your ants, because they're liable to meet a grisly end. Poor Emily was sucked into the maw of a passing power mower, and many of her sisters died at the hands (mandibles, rather) of ant lions, spiders, and marauding red ants. One of the next lessons is that individual ants are expendable; it's the health of the colony that counts. When Emily died, for example, she was instantly replaced by an

ant who began the task of gathering food.

The object is to make your ants defeat the enemy red ants as you amass territory in a suburban house and yard. As an added pleasure, the ants can eventually drive away the home's owner. The playing field is a grid of 192 squares, visible in its entirety or one square at a time. Within each square, you're offered a bird's-eye view, a close-up view of individual ants, or an underground look at the colony's tunnels. Your protagonist can lead other ants to food, rally them to battle, or just hang around and get fed by passing colleagues.

Basic play satisfies those most primal of video-game instincts: gathering food pellets and fighting the enemy. (I did encounter one bug, as it were: every so often a red ant

would feed my ant—but I suppose even ants get confused sometimes.) As your colony progresses, you can tune its members' behavior (foraging, digging, nursing) and "caste" (worker, soldier, or breeder). Career opportunities abound; you can change your own ant's caste at any time.

SimAnt's documentation—which includes fascinating information on real ants, a glossary, a bibliography, and suggested reading—reflects considerable research on ant behavior. Part of the simulation's charm is that you can operate at various levels of sophistication; simply pit black against red, or study ant behavior by watching the simulated ants leave scent trails that lead to food or signal danger. The program's attention to detail is another plus; the animated ants scurry through a landscape that includes everything from passing caterpillars to debris under the couch, and auditory effects include an approaching lawn mower, a thunderstorm, and horrible chomping noises if your ant is devoured.

SimAnt requires a good deal of patience; only certain personality types will enjoy manipulating simulated insects for hours on end. Myself, I found SimAnt mesmerizing, often spending an evening foraging, fighting, and digging tunnels. And unlike other Mac games, SimAnt didn't make me feel guilty for slacking off; heck, being an ant is hard work.—ERFERT FENTON



Fed to the Lions If you're not careful, your simulated ant may fall prey to a simulated ant lion, one of the many perils in the world of SimAnt.

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Backup Software

FastBack Plus 2.6

PROS: Multiple modes; reads backups created by DOS version. **CONS:** Data file filters somewhat cumbersome. **COMPANY:** Fifth Generation Systems (504/291-7221). **REQUIRES:** Mac Plus; System 6.0. Recommended: Hard drive. **LIST PRICE:** \$189.



THE LATEST VERSION OF FIFTH Generation Systems' popular FastBack Plus is a real speed demon and sports a marvelously simple interface that should inspire even the most hardened shirker to back up. Version 2.6 provides three modes, enabling the user to tailor the application to his or her particular requirements. Each mode provides the same basic backup capabilities; you can switch to more advanced levels as your needs dictate.

FastBack Plus Express, the simplest mode, has almost everything the average user needs in a basic backup application. A single concise dialog box lets you specify backup criteria, including source drive, target drive, and whether to back up or restore. This interface also lets you choose to perform a full or incremental backup, exclude

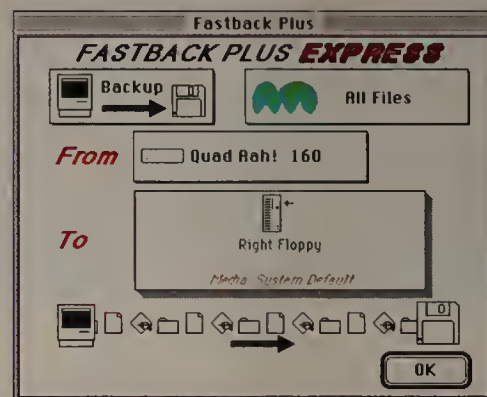
application files, and select specific files for backup. FastBack Plus Express even prints labels for backup floppies.

The Short Menu mode adds compression capabilities and enables you to compare backed-up data with data existing on a hard drive. These are handy features, but I wish they had been integrated into the FastBack Plus Express mode, leaving only two levels, Express and Full Menu.

Full Menu adds a macro function for autolaunching the program for unattended operation. Full Menu also provides several filters to enable you to sift through data and applications in order to include or exclude files for backup; filtering criteria include date, size, and file creator. This is a valuable asset, but the interface is cumbersome.

Both the basic and advanced features of the program perform well. Operating in Short Menu mode, FastBack Plus backed up 60MB of information to a SyQuest drive in only 10 minutes, with an average compression rate of 40 percent. The restoration was equally zippy. Note that this speedy backup is based in part on the backup medium and the type of CPU. Mac Plus users backing up to floppy disks can expect speeds of about 1MB per minute.

You should also be aware that FastBack Plus does not back up files in a Finder-readable format as, for example, Magic Software's BackMatic does. This is really



Express Window The FastBack Plus interface is a dream to use. Just point and click, and in a few seconds you have set the stage for a streamlined backup session.

a minor consideration, however. Before launching backup copies, you must simply use FastBack Plus's Restore command. Your files will reappear in their original locations.

One word of warning: FastBack Plus can quit unexpectedly due to memory shortages when running in the background. Fifth Generation Systems recommends increasing the FastBack application memory to 2MB when using a hard drive as the backup medium; the same trick works when backing up to a removable-cartridge drive.

All things considered, FastBack is a solid backup utility that will please the novice and the advanced user.—MATTHEW R. CLARK

Color Paint Program

Color It 1.0

PROS: Inexpensive; 15 levels of undo; built-in virtual memory; direct scanner support; versatile selection tools. **CONS:** Badly organized manual; buggy. **COMPANY:** MicroFrontier (515/270-8109). **REQUIRES:** Mac II; 1MB of RAM; hard drive; System 6.0.4. Recommended: 2MB of RAM; color monitor. **LIST PRICE:** \$119.95.



IN THE HIGH-TECH WORLD, WE generally expect each new year to bring more-sophisticated products and lower price tags. Today's hard drives, monitors, scanners, printers, and CPUs are more powerful and comparatively less expensive than their predecessors. But the price of software has been creeping upward. In early 1988, Mac paint programs averaged \$160 retail, and all but one were black and white. A scant four years later, the average price is \$340; the highest is \$799. Admittedly, the new packages do more; color, for example, is now the rule, not the exception. But the leisurely pace at which the software has advanced does not justify the fat price tags.

Color It is a refreshing exception. Though hardly revolutionary technologi-

cally, it sells for less than any other color paint program except Delta Tao Software's Color MacCheese. Yet Color It offers antialiased brushes and text, built-in virtual memory, and a magic-wand selection tool—a collection of capabilities otherwise limited to a few high-end programs. This alone makes Color It a remarkable bargain.

Color It enables you to undo or redo 15 operations in a row. Use the eyedropper tool to pick up a gradation of colors; open large images using disk-based virtual memory; scan images directly from any device with an Adobe Photoshop or Aldus Digital Darkroom driver; and mask portions of an image using a selection tool or a separate alpha-channel document. Color It's selection tools are also noteworthy. The magic wand, lasso, and 14 different marquee tools let you add to or subtract from existing selections. You can even feather a selection to create soft edges.

The most singular departure from other paint programs is the magic-wand tool. Not only can you specify numerically the range of colors selected when you click on a pixel, you can also drag the tool to indicate a range of pixels for your selection. Then, using controls located on the tool palette, you can fine-tune the range of selected colors.

Newcomers to color painting will especially appreciate Color It's previewing options. When applying any filter or color-

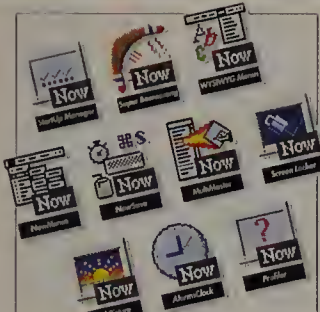
balance command, for example, you can preview the results from inside a dialog box. The preview shows only a small detail of the image, but you can select the detail to be displayed. You can test brushstrokes and other painterly effects by scribbling on the Scratch Pad floating palette.

But while Color It's feature list is extensive, the program is frequently mystifying. For example, the default tool palette displays 20 tool icons and offers 2 additional tools via a pop-up menu. If you don't like this setup (and who would?), you can drag tool icons from one location to another. But dragging icon A onto icon B gives you two A's instead of switching A and B. The manual doesn't explain that you can configure the two A's differently—a fat antialiased brush and a tiny, hard-edged one, say. The manual is organized oddly. Considering that the interface regularly departs from the norm, a stronger manual is essential.

I also found Color It to be buggy. Twice, regular patterns of triangles appeared in my painting. Another time, a selection fixed itself to my painting while a duplicate of the selection remained floating. Luckily, I had no problem that ⌘-Z couldn't undo.

At \$120, these bugs and the bad manual are forgivable. No other painting program offers so much for so little. For my money, that's a big step in the right direction.—DEKE MCCLELLAND

MacWeek & MacUser's 1991 Utility Product of the Year!



Now Utilities™

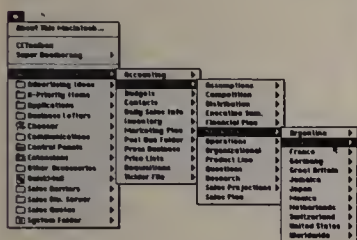
The Ultimate System Enhancement Collection

What did it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh utility product?

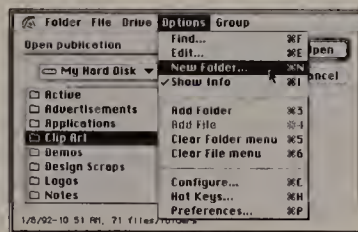
Unprecedented performance, compatibility, and value. In this case, a collection of 10 utilities that does for System 7 what products like SUM and Norton do for hard disks — only more so. As *MacUser* put it, "Now Utilities will make your Macintosh faster, easier, and more fun to use." For example:

- **StartUp Manager™** provides complete extension management
- **Super Boomerang™** finds files and folders instantly
- **WYSIWYG Menus™** groups fonts in their own typefaces
- **NowMenus™** makes the Apple Menu hierarchical
- **AlarmsClock™** displays the time & reminders in the menu bar
- **NowSave™** automatically saves files to prevent data loss
- **Screen Locker™** keeps confidential information confidential
- **MultiMaster™** launches applications and files
- **Profiler™** analyzes system configurations
- **DeskPicture™** puts color and B&W pictures on the Desktop

In fact, every utility in the collection is the best of its kind. All of the utilities in the collection are also designed, tested, and guaranteed to work together — and with anything else your customers may have...even System 6. No wonder *MacUser* gave it a perfect five mouse rating and called it "a must-have for experienced users and novices alike."

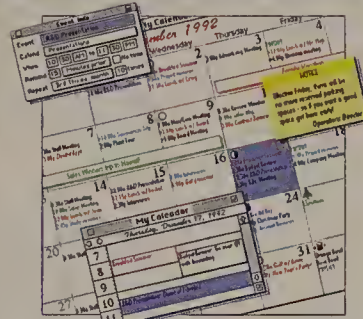


NowMenus saves you a lot of mousing around by creating submenus up to 5 levels deep for anything you put in your Apple Menu items folder — even aliases and other folders. It also pops up the menu bar wherever you click your mouse



Super Boomerang lists your most frequently used files and folders in all Open and Save dialog boxes and in the Apple menu. It also lets you find files by name or content...even if they've been compressed (a file name search on a 100MB hard disk can take only 3 seconds — without requiring an index)

MacWeek & MacUser's 1992 Network Product of the Year?



Now Up-to-Date™

The only calendar that keeps your appointments and your associates up-to-date — whether you're in the office, at home, or on the road

What will it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh network product?

Perhaps *Now Up-to-Date™*: the only Macintosh application that keeps your appointments and your associates up-to-date — whether you're in the office, at home, or on the road.

Organize Your Appointments *Now Up-to-Date* can schedule a meeting to occur at 9:00AM on the first Tuesday of every month and have it automatically appear on your associates' calendars. Scheduled events can be private, shared, or restricted (i.e., only available to people with the correct password.)

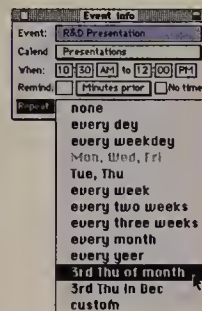
Remember Your Meetings *Now Up-to-Date* keeps track of all of your meetings and appointments, so you don't have to. It can also provide advance warning of upcoming events to ensure everyone shows up on time.

Mobilize Your Office *Now Up-to-Date's* versatile printing options include support for all major appointment books, so you can take your calendar on the road. If you own a PowerBook you'll appreciate the fact that *Now Up-to-Date* doesn't require you to be connected to a network to see your schedule. For that matter, you don't even need to own a network: *Now Up-to-Date* makes a great single user product, too.

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With all this attention from the press it's not surprising that *Now Utilities* is already one of the best-selling products on the Macintosh. *Now Up-to-Date* looks to be just as popular. Call *Now* at 1-800-237-3611 to learn more about both of these great products, and how they can help you get more out of your Macintosh.

**Now
Software**

Personal Organizer

DayMaker 1.01

PROS: Versatile organizing system; flexible alarm options; easy to customize. **CONS:** Limited printing options; occasionally confusing interface; serialized network copy protection. **COMPANY:** Pastel Development Corporation (212/941-7500).

REQUIRES: Mac Plus; System 6.0.4; hard drive.

LIST PRICE: \$99.95.



ADMIT IT. I'M A SUCKER FOR ANY product that promises to organize my work life. In spite of my continual efforts to impose order on what passes for my office, most days I feel lost in a whirlwind. So I'm happy to report that DayMaker, in spite of a few rough edges and missed opportunities, really does help maintain an island of sanity in the 9-to-5 sea of confusion.

Imagine a series of index cards, each one containing a discrete item on your to-do list. In DayMaker, these are called items, and they form the basis for the program's organizing system. Each item can be assigned as many tags as you like. Tags are identifiers that allow you to sort and filter the items, and they can be assigned high, medium, or low priority levels. An item to finish a bro-

chure and an item to call a designer could both be assigned the tag "CD Project" and a medium priority level, while an item to write a letter could be tagged "Macworld Expo" and assigned a high priority. Tagging items allows you to create to-do lists for specific projects; prioritizing assignments allows you to sort these items.

Items can be note items—things that don't have to occur at a specific time or date—or calendar items, which do. Note items can also be designated as to-do items, letting you check things off as done. Calendar items can be designated to-do items or alarm items, which can have reminders attached to them. It sounds complicated, but these four distinctions are all you have to understand to use DayMaker successfully.

You can view items five ways. The Month, Week, and Day views all offer calendar views (which show items that must occur at a specific date and time). I found the Week view to be most useful for planning. The List views let you see both calendar and note items and serve as your central to-do list. The Single Item view offers a full-screen view of each item, with room for up to 15 pages of notes.

Customizing DayMaker is easy. To create a custom view, you first select one of the five available views, pick which item tags you want to see displayed, and set up a search criteria to narrow down the items to be

viewed. You can give your custom view a name and assign it a key combination, and it will appear in the CustomViews menu. For example, a weekly calendar view that shows only the undone items you've identified as Follow-Up Stuff could be saved under the name Undone Follow-Up Items and recalled by pressing ⌘-I. You can create and assign a keyboard equivalent to a custom item, which can have preassigned tags and attributes and a priority level. DayMaker ships with a DayMaker Starter File that contains premade custom views and items to help you get started quickly.

There's a lot more to this product, including ways to customize the List views; autodialing; and editable, hierarchical tags; but I ended up using its basic features most often. I found a few annoying (but trivial) bugs, and discovered that the bigger a file gets, the longer it takes to load into RAM. And although I'll use DayMaker, it won't replace my address-book DA (After Hours Software's TouchBase), which offers the ability to print fax cover sheets, or my calendar DA (CE Software's Alarming Events), because DayMaker doesn't allow scheduling recurring events or provide the easy-to-read printouts that Alarming Events does. Still, DayMaker does what no other personal organizer I've seen yet can do; it helps me to focus on critical tasks in the midst of chaos.—LIZA WEIMAN

Send-and-Receive Fax Modem

QuickTel Xeba 9600

PROS: Sleek design; supports MNP Level 5 and V.42bis error correction; front-mounted power button; comparatively low cost. **CONS:** Design can be awkward on desktop; manual has no index.

COMPANY: Logicode Technology (805/499-4443). **REQUIRES:** Mac Plus; System 6.0.2.

LIST PRICE: \$349.



LOGICODE TECHNOLOGY'S NEW modem comes in a sleek, slanty, futuristic-looking enclosure that looks something like a shark fin or maybe an airfoil. This is undeniably the world's first aerodynamic fax modem.

Instead of the usual row of indicator lights along the front, the QuickTel Xeba 9600 has a large circular display of eight icons that are easy to interpret and more immediately informative than ordinary LED status lights. The power button is easy to access, and the platinum gray casing makes the unit a perfect match for the Mac.

But it's hard to find a comfortable spot on your desk for a shark fin. Positioning it vertically reduces its footprint considerably, but the slanty design causes the unit to hang

at a steep angle, and it teeters when you hit the power button. Logicode includes a bracket to attach the modem to the left side of a computer or desk.

Fax^{stf}, the software that now comes with the Xeba, offers all the features you'd expect, including multiple cover-page options, fax broadcasting, and delayed transmission. Faxes can be sent from any application by selecting Fax Print from the Chooser. Incoming faxes can be stored as TIFF, PICT, or MacPaint files. You can create custom paper sizes for faxes, and you can view faxes at 50, 75, 100, 200, and 300 percent. Two outstanding features are QuickFax, a desk accessory that lets you compose and send faxes of up to 255 characters, and the FaxMenu control panel, which lets you choose Fax Print with a keyboard command instead of with the Chooser.

Unlike Quick Link (QL) II Fax, the irksome software that shipped with QuickTel fax modems until December 6, 1991, Fax^{stf} doesn't have to be disabled each time you use another terminal program, and it doesn't interfere with data-modem transmissions. (If you try to use the modem with other software while QL II's Fax Manager is running, you experience a series of telecommunications nightmares: frequent modem freezes, failed transmissions, garbage characters.) Paired with Fax^{stf}, the Xeba transmits faxes with almost perfect consistency. All the faxes

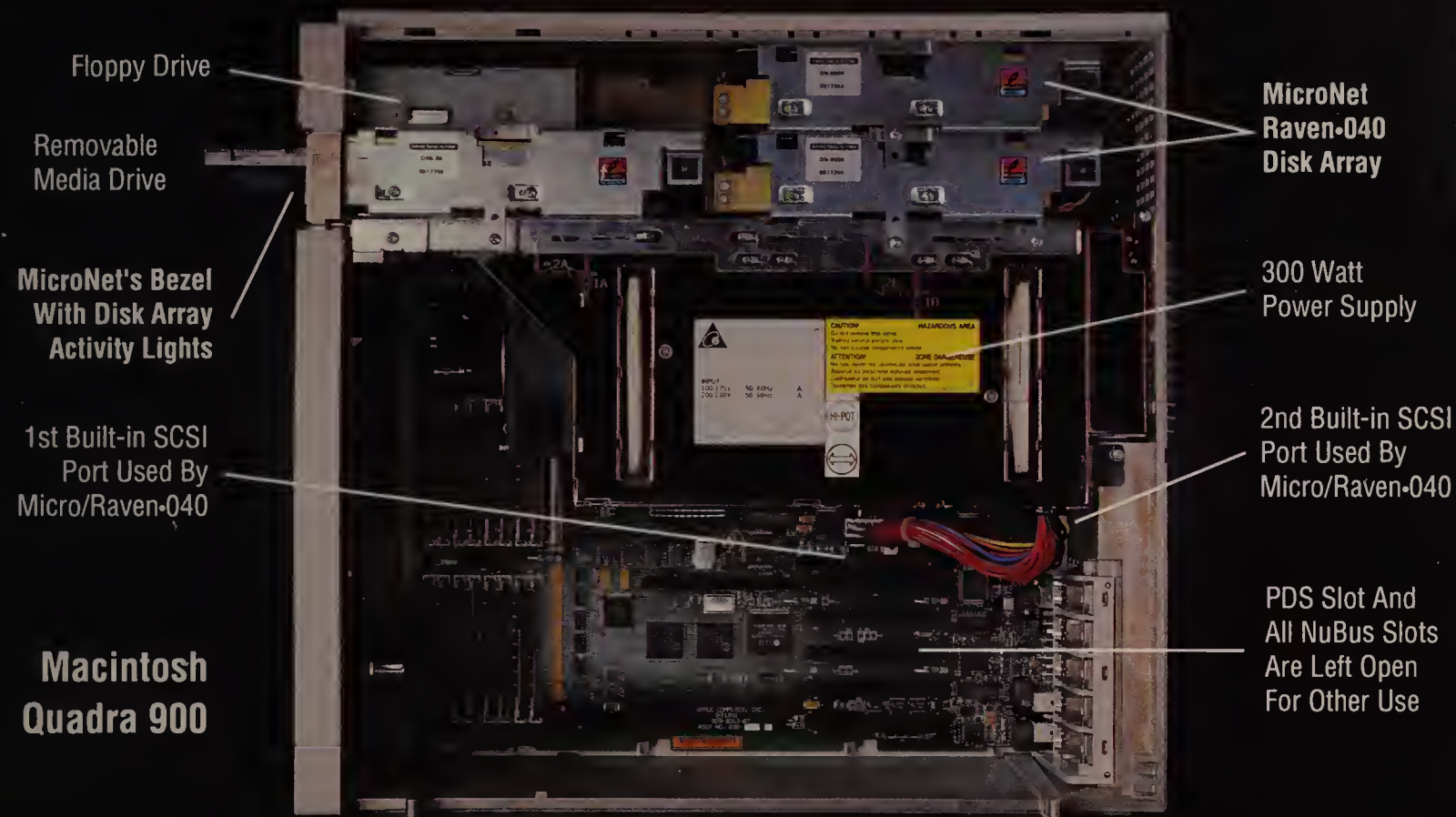
I sent or received were crisp, clean, and on a par with those handled by regular fax machines. (Logicode received so many complaints about QL II Fax that it is offering registered owners an unadvertised, low-cost upgrade to Fax^{stf}.)

As a 2400-bits-per-second data modem, the Xeba performed without a hitch when connecting to online services and local bulletin boards. Protocol transfers were less successful; receiving files using Xmodem seemed to be impossible, although uploading in Xmodem was fine. The Xeba is equipped with both V.42bis and MNP Level 5 data-compression protocols.

The modem also comes with Quick Link II (without the fax component), a serviceable telecom program from Smith Micro Software that offers seven file-transfer protocols and five terminal emulators. It even has a macro maker that lets you launch a dialing routine or log-on script with a single keystroke. However, the Quick Link manual contains no technical-support phone number, and the modem manual has no index. Fortunately, Logicode offers helpful phone support.

The Xeba is priced lower than most of the send/receive fax modems now available. With Fax^{stf} included, it is a solid buy that'll give you a full range of fax features and a data modem that will perform well—even in a wind tunnel.—JOSEPH SCHORR

Disk Array•040!



High Performance Storage For The Macintosh Quadra 900 MicroNet's Raven•040 Internal Disk Arrays

MicroNet's RAVEN brought unbeatable disk array performance to the Macintosh II. Now there's a more powerful Macintosh. The Quadra 900! It's based on 68040 technology and it's fast. The performance of the Quadra can be greatly increased by use of a MicroNet RAVEN•040 disk array.

The RAVEN•040 is a two-drive array that employs FAST•SCSI-2 technology. With data bursts as fast as 10 MBytes/sec, and average access times as low as 7 ms, these new systems are four times faster than the standard 160 MByte drive. They install internally and range in capacity from 624 to 2,020 MBytes.



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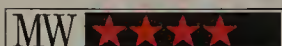
Circle 113 on reader service card



Mathematical Exploration Software

TeMath

PROS: Rich set of tools for exploring graphs and functions; built-in calculators for scientific math and matrix arithmetic. **CONS:** Occasionally irregular expression editing. **COMPANY:** Brooks/Cole Publishing (408/373-0728). **REQUIRES:** Mac Plus; 2M8 or RAM for MultiFinder; System 6.0; second disk drive. **LIST PRICE:** \$39.95.

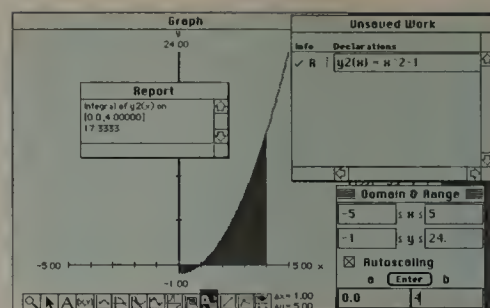


TEMATH IS A BARGAIN IN EDUCATIONAL software. First, in a market that features student versions of software that cost nearly \$200, TeMath sells for about the price of a textbook. Second, it provides all the help a student needs to understand what's really happening in differential and integral calculus. Beyond this, TeMath includes powerful calculators that can evaluate expressions in algebraic notation and handle matrices as well.

But the main point is what it has to offer the student. Basically, differential calculus is concerned with finding tangents to the graphs of functions at arbitrary points along the graph, and integral calculus is concerned with finding areas between plot axes and the graph lines. These two humble ac-

tivities contain the answers to a huge variety of questions in math and science. TeMath provides graphing facilities and sets of tools (represented by icons along a palette at the bottom of the Graph window) for studying the functions typically encountered in precalculus and calculus courses.

Functions can be graphed in standard rectangular coordinates (x, y), or in polar (r, θ) or parametric form ($x(t), y(t)$). Once you pick a graph type, the tools in the Graph window change to give you the appropriate modes of analysis. For rectangular plots, you have tools for cursor position, arc length, root finding, tangent line, curve minimum and maximum, asymptote, integration, curve intersection, difference integral, fixed-point identification, and line-segment measurement. In polar plots, TeMath gives you tools for finding extrema, graph coordinates, curve intersections, zeroes in r , and integration of area slices. Finally, parametric tools are simply the line-segment tool and a parametric tracker, which reports t, x , and y for points you highlight in the parametric plot. This tool set is sufficiently complete that you can answer any numerical question in a first-year calculus book (for symbolic computation, such as indefinite integration, you need Calculus T/L, Brooks/Cole's companion product). TeMath also makes it possible to formulate numerical investigations that go beyond the



It Adds Up The integration tool gives the value of the definite integral for any curve between the limits you select (shaded area in the plot). Exploring integrals and tangents to curves is a straightforward and excellent way to see what lies behind the methods of calculus.

same old kinds of exercises textbooks have been posing for several hundred years.

The graphing and calculus-tools section is a stellar example of interface engineering—you can use all the functions without consulting the manual. Using the calculators is not as intuitive (some conventions in the expression editor are atypical of the Mac), but in fairness it's the ambitious scope of the expression and matrix calculators that forces you to consult documentation.

If you buy this program, you can be sure that you'll actually use it. That's not invariably true of math or educational software, and it's a real tribute to this software and its authors.—CHARLES SEITER

Legal Document Templates

The Desktop Lawyer 3.0

PROS: Manual provides excellent overview of legal concepts. **CONS:** Volume of forms offered, plus lack of printed samples, makes choosing forms a two-step process; poor document-naming scheme; no line-by-line instructions on forms. **COMPANY:** The Open University (800/874-0388). **REQUIRES:** Mac Plus; Microsoft Word 3.0. Recommended: Hard drive. **LIST PRICE:** \$139.95.



Legal LetterWorks 1.0

PROS: Text can be opened by any word processor; modular approach to contract clauses; good document-naming scheme; manual includes printed version of each form. **CONS:** Few forms for estate planning; legalese in manual may scare off some users. **COMPANY:** Round Lake Publishing (203/438-5255). **REQUIRES:** Mac 512KE; System 6.0; word processor. Recommended: Hard drive. **LIST PRICE:** \$79.95.



THE PERSON WHO BOUGHT YOUR car last month isn't paying; your fiancé is asking for a prenuptial

agreement; and your real estate agent wants a document certifying that the condo you're selling isn't located on a hazardous-waste site. What do these scenarios have in common? They require legal documents. Fortunately, two collections of legal forms enable you to create such legal documents as articles of incorporation, notices to quit, bulk sales of assets, trusts, partnership agreements, and contracts for sale of a business.

One of the principal differences between the two packages is their documentation. The LetterWorks manual is very thorough, offering a complete preview of each form, with comments and line-by-line instructions. For those who are already familiar with complex contractual and financial concepts, LetterWorks provides quick access to the nuts and bolts of the forms. The Desktop Lawyer's documentation provides a broad overview of many legal concepts but it neglects to give you clear direction as to how or when to use a particular form.

The Desktop Lawyer's manual doubles as a minicourse on business and real estate transactions. The first three chapters briefly cover topics ranging from the difference between written and oral contracts to bulk transfers of partnership assets. Another chapter lists the fee for filing articles of incorporation in all 50 states, and contains a brief checklist of what to do if called to testify at a trial. The manual includes more

than 300 forms, divided by category, with a sentence or two describing each form. What you won't find is a printed sample of each form. The manual provides checklists suggesting forms to consult for a given transaction, but there are no line-by-line instructions geared to filling in each blank.

Although LetterWorks offers fewer forms than The Desktop Lawyer (165 versus more than 300), the package's flexible approach makes up for this discrepancy. For example, while The Desktop Lawyer's forms are in Microsoft Word 3.0 format, LetterWorks' forms are in text format, enabling you to open them with any word processor. LetterWorks' modular form design also makes it more versatile. For example, the LetterWorks collection provides individual real estate clauses that you can merge into a primary real estate contract. The LetterWorks manual includes a printed copy of each form. Forms are preceded by an explanatory paragraph or two, with notes on the special conditions or consequences of using that particular form.

If you need a broad introduction to legal concepts, buy The Desktop Lawyer. If you already have a basic understanding of where you are and where you're going with your legal problems, and if you're the type who likes to compare clauses and commentary, then you'll probably prefer LetterWorks.—BILL DAVIES

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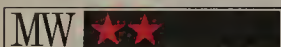
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System-Error-Recovery Utility

Crash Barrier 1.0.1

PROS: Witty manual; includes good auto-saver; money-back guarantee. **CONS:** Works only some-times or not at all. **COMPANY:** Casady & Greene (408/484-9228). **REQUIRES:** Mac Plus; hard drive; System 6.0.2. **LIST PRICE:** \$79.95.



A SYSTEM CRASH IS WHEN YOUR Mac ungracefully declines to let you continue working due to some internal bickering of its own. The famous "Sorry, a system error has occurred" message appears with a picture of a short-fused bomb. Crashes aren't just frustrating, they also make you feel somehow dumb for not knowing what happened or how to prevent them. Now, in an effort to ameliorate the situation, comes Crash Barrier. It's a brilliantly conceived control panel that would be worth its weight in gold—if it worked consistently.

To an extent, Crash Barrier does what it's supposed to do: it intervenes when you have a system crash. That is, when your software decides to "scream, hold its hands up and wave them about in panic, and then crash" (as the thorough manual puts it),

Crash Barrier displays its own dialog box instead of the bomb box. It offers wonderful-sounding buttons: Fix It, Continue, Resume, Un-Hang, and so on. Your heart leaps up: any of the above, please! You sit back, relieved, wondering which button to click.

It doesn't much matter; most of the time, none of them work. In the two months Crash Barrier was installed on a guinea-pig Mac IIcx, there were 33 system crashes; Crash Barrier succeeded in exiting the crash only once. On a Mac IIx with fewer extensions and control panels, there were 14 system crashes during the same period. Crash Barrier didn't rescue the Mac once. Occasionally, a click on the Fix It button seems to do something. But after you bite your nails for a moment, the same Crash Barrier box returns . . . and so on, until even Crash Barrier is frozen, and you have to push the Mac's Restart switch.

It turns out that the Macs in my office were only halfway typical: Crash Barrier, according to its programmer, only works for certain types of crashes. Since most people have the same kinds of crashes regularly, Crash Barrier is an all-or-nothing proposition—if you have the right kinds of crashes, it'll work. If not, it'll seem useless. (This info doesn't appear in the manual, by the way.) I interviewed a few users by phone, and learned that Crash Barrier rescues the lucky ones around 25 to 75 percent of the time.

What worries me is that Crash Barrier might make you slightly less vigilant. You might save less often, or not buy a more reliable safety net like Last Resort (Working Software), or otherwise place your trust in this well-meaning but possibly ineffective control panel.

As a consolation, Crash Barrier offers a pair of more reliable options. It has a superb autosave feature that saves your work every few minutes (or keystrokes, or mouse clicks) automatically. It also has an option to increase your *system heap*, the chunk of memory devoted to your System and its related files (like INITs and fonts). (Running out of system-heap memory may be the most common cause of System 6.X crashes.) Of course, you can get autosavers and heap-adjusters for a lot less than \$80, many in shareware. Furthermore, System 7 is supposed to monitor its own system heap, making Crash Barrier's heap-adjustment control either a redundant frill or a security blanket.

So what does a reviewer write about a program that can be proven to work only by hearsay? That its interface, phone support, manual, and spirit are all commendable, and the autosave and System-memory features work fine. That it carries a money-back guarantee, thank goodness. And that you should try it before getting optimistic, lest your hopes crash along with the system. —DAVID POGUE

Super-High-Density Floppy Drive

QuadFlextra

PROS: Reliable; convenient; lowest cost removable-cartridge option. **CONS:** Modest speed and capacity. **COMPANY:** Quadram (404/923-6666). **REQUIRES:** Mac Plus. **LIST PRICE:** \$495 (includes four 25MB disks); disk \$30.



THE QUADFLEXTRA IS A REMARKABLE little box that lets you put just over 20MB on a single 3½-inch floppy disk. (Following the accepted inflationary tradition among removable-media vendors, this very-high-density disk is called a 25MB disk.) The technology is interesting, the resulting device is simple and reliable, and it lets you fit lots of data in your shirt pocket.

The Quadram system, which was licensed from Brier Technology and is now manufactured by several subsystem producers, uses an ingenious disk-formatting method. All the recording is actually performed on the top surface of the disk, in zonal recording mode (all sectors are a uniform size) for speed. The bottom side consists of precision prerecorded positioning tracks that are used to control the read-write

head. This scheme yields data integrity comparable to that of a standard hard drive, and an average seek speed comparable to that of a slow hard drive.

The QuadFlextra's data integrity is indeed remarkable, particularly since this device records 777 tracks per inch on a magnetically coated plastic disk. In an experiment designed to induce severe thermal distortion (heating one-fourth of the disk surface to 110 degrees Fahrenheit while holding the rest near freezing), the unit was able to perform error-free recording and reading. The data-transfer speed in this scheme is magnificent for a floppy but modest for a hard drive. It takes 6 minutes to back up 10MB of real-world files, and it takes about twice as long to open applications from the Flextra as from an Apple 40MB hard drive.

In the spectrum of removable storage technology, where does the Flextra fit? If this product had been ready four years ago at this price, it would have conquered the Mac universe. Now it faces two sorts of competition. First, it costs as much as the new 88MB SyQuest removable-cartridge drive, and the cost per megabyte of media is about the same. However, since the Flextra disks are much smaller, Quadram can boast a physical size advantage to offset its smaller per-disk capacity. Second, the Flextra costs about half as much as the new 3½-inch mag-

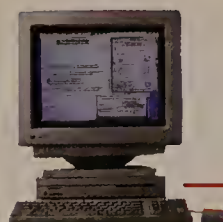
neto-optical (MO) systems, but these offer cheaper storage per megabyte, guaranteed indestructibility, and much more data (approximately 120MB) in the same convenient size. The real problem presented to the QuadFlextra is price competition from half a dozen vendors bringing out MO drives that meet the Sony standard for the MO format. When drives in this category begin to approach \$1200 or so for a subsystem, Quadram will need to ship the 100MB version of the Flextra, reportedly under development.

Another potentially ominous competitor, in Flextra's own 25MB smaller-capacity category, is the new floptical drive. The first of these to appear, from Liberty Systems, already cost a bit less (\$100) than the Flextra and offer nearly indestructible pure-optical (that is, nonmagnetic and non-magneto-optical) recording.

If you need to back up a small (20MB to 100MB) hard drive or store a few hundred megabytes of files, the QuadFlextra is a good choice that's available right now. It's rugged, reliable, reasonably priced, installs with no fuss, and you can keep your backups in a standard floppy-disk box. For larger storage requirements (500MB and beyond) it's just not practical, however, so keep reading *Macworld* for announcements of price reductions in 3½-inch MO drives or the next move from Quadram. —CHARLES SEITER

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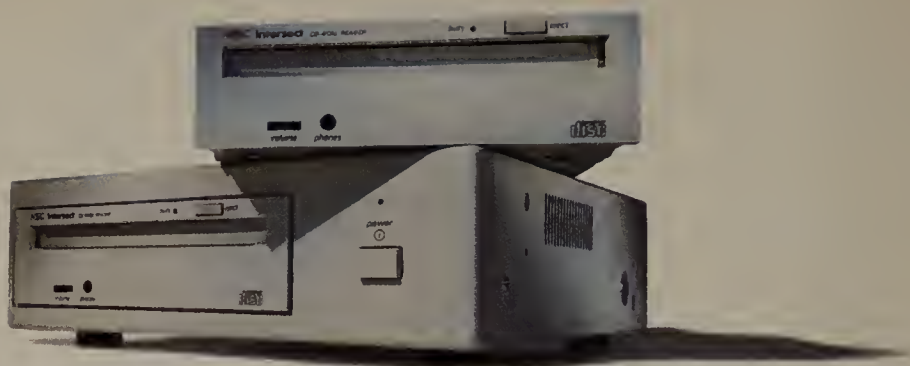


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In Search of the Seven-Point-Opus

BY DAVID POGUE

CAN THINK OF THREE GOOD reasons you might want to buy a book about System 7. First, if you get Apple's impressive new operating system from a user group or bulletin board, a System 7 book is the closest thing you'll have to a manual. Second, Apple's clear-but-conservative manuals leave out enough shortcuts and hidden features to fill an encyclopedia. And third, if you're leery of upgrading to System 7, a little prose might help you negotiate the cons.

The System 7 books are aimed at specific markets. Some are for the beginner, others for the power user, others for the corporate systems manager. Trouble is, you can't judge these babies by their covers; their juicy-sounding titles don't even hint at the actual slant of the contents. To discover the truth, you can either stand in the bookstore long enough to skim all 3000 pages . . . or read the following.

The System 7 Book

Conventional wisdom says: If you don't want bugs in your software, don't buy version 1.0 of anything. Maybe it's true of books too. This one may have been first on the market, but holy mackerel, is it full of mistakes! Many of these books were written by authors using prerelease copies of System 7, so some errors are to be expected. But this one takes the mistake cake. "You cannot change the icon for software applications," errs author Craig Danuloff at one point. Comments in Get Info boxes don't get erased when you rebuild the desktop, he gaffes in another. And there's sloppy editing: eight misspellings of *marquee*; the same illustration pasted onto two facing pages; miscaptioned graphics; and—my personal fave—a screen shot of the Finder where the Special menu has inexplicably been renamed SanJosé.

The writing style is right on: informal, witty where it's needed most, and always considerate of the beginner. Let's hope the promised two free updates are beta-tested better than the book itself (Ventana Press, \$22.95).

MacWeek Guide to System 7

Don Crabb is a super-informed, colorfully opinionated columnist for *MacWeek*, and

he's written a super-informed, colorfully opinionated book (Ziff-Davis Press, \$24.95). To his immense credit, he alone acknowledges that System 7 can present some complex technical snarls—and he thrives on 'em. He happily mucks around in thorny issues that no other book even mentions: mixed-System networking, electromagnetic emissions, and Apple's support lines, for starters. He's hilariously ornery: "[Disk First Aid is] Apple's attempt at providing a disk fixing application. Frankly, it stinks."

Call me perverse, but I'm sorry the book is written for the corporate computer-systems manager. Much of it focuses on networking, training, and maintenance issues; chunks of it probably won't interest the solo Mac user. On the other hand, if you are a systems director, get this pricey but indispensable guide, pronto. And get Crabb to write a System 7 book for the rest of us!

Introduction to Macintosh System 7

Marvin Bryan's book (Sybex, \$19.95) uses that everything's-under-control tone you may recognize from Apple's manuals. In fact, every word reflects the official Apple viewpoint; don't read this one for humor, iconoclasm, or technical depth.

In fact, since it's patiently written and attractively designed, you'd think this book would be ideal for the newcomer. So why isn't it? Because its coverage is bizarrely scattershot. For example, there are handy discussions of file sharing and balloon help—but not a word on Finder navigation, stationery pads, or the new Trash can. The inclusion of product plugs seems odd in itself, but the selection of products he plugs is even odder: FrameMaker and DesignStudio, for example, but not PageMaker. If Bryan had given equal time to all topics, this would have been the ultimate guide for the first-timer.

The Macintosh Bible Guide to System 7

You gotta hand it to a book that has the guts to begin, selflessly enough, by acknowledging that you might not want to upgrade to System 7:

"If you're happy with your system, it may not be worth your trouble or expense to switch." You also have to admire the \$12 price tag (Goldstein & Blair).

If you understand that Charles Rubin's book is exclusively for already fluent Mac users, you're likely to be pleased. The lucid, informal style makes the reading easy, and the big bold subheads help you scan for the stuff that interests you (from "If the installation fails" to "File sharing step-by-step").

Some sentences and graphics don't make sense because they were written before System 7's official release. And except for the friendly file-sharing chapter, the book shies from delving into technical subjects (DAL, IAC, font wars). But if you're looking for the three most important aspects of a computer book—clarity, clarity, and clarity—then the Bible bunch has done it again.

Mac System 7: Everything You Need To Know

This sprawling, slightly disorganized, authoritative 540-pager doesn't contain absolutely everything about System 7, but it sure comes close (Sybex, \$34.95). Deke McClelland writes from an insider's point of view. He's written the only book that teaches you how to zap the PRAM (if you know what that is), that intelligently discusses the technicalities of fonts and multitasking (if you're interested), and that gives a preview of System 8 (if you can stand it). There are pages of directions for fiddling with System 7's innards using ResEdit (a software tool kit for programmers). This book is not for the novice.

In raw informational content, McClelland's book blows the others off the screen. The included disk of shareware is neat. And the writing is usually lively, and sometimes uproarious. That's good, since poor editing often mars the prose. The preponderance of passive-voice sentences is especially tiring ("The Open command may be initiated by . . ."). If that writerly stuff doesn't irritate you, and if you are technically minded, then

continues



*Shopping
the crowded
System 7
bookshelf*

SYSTEM 7 BOOKS

	Rain	Danuloff	Poole	McClelland	Crabb	Bryan	Rubin	Nelson	McQuillen
Number of pages	440	390	350	540	295	240	250	150	125
Price	\$24.95	\$22.95	\$24.95	\$34.95	\$24.95	\$19.95	\$12	\$12.95	\$9.95
DISCUSSION									
Whether or not to upgrade to 7.0	●	○	●	○	○	○	●	○	○
Importance of upgrading hard disk drivers	●	○	○	○	●	○	●	○	●
Installation step-by-step	●	●	○	○	○	●	●	●	●
Mac basics (point, click)	●	●	○	●	○	○	○	○	●
Finder keyboard navigation	○	●	●	●	○	○	●	●	●
Hidden option-key tricks*	○	○	●	●	○	○	○	●	○
Memory fragmentation	●	●	●	●	○	○	○	○	○
PowerBooks and Quadras	○	○	○	●	●	○	○	○	○
QuickTime	●	○	○	○	●	●	○	○	○
Availability of Mode32	○	○	●	●	●	○	○	○	○
Data Access Language (DAL)	●	○	●	○	●	○	●	○	○
Troubleshooting	●	○	●	○	●	○	**	●	○
Analogy used to explain an alias	call forwarding	a door to a room	stand-in or agent	stand-in	named place-holder files	tiny stand-in	remote-control switch	sort of like a duplicate	remote control

● = yes; ○ = no. *In control panels, window zoom boxes, and so on. **For file sharing only.

by all means—lay your hands on McClelland's weighty work.

10 Minute Guide to System 7

A glance at this pint-size book suggests that it was thrown together by some marketing group to cash in on the System 7 craze. Ten minutes? Are they kidding?

But surprisingly, Harry McQuillen IV has done an impressive job of distilling complex information into a simple but not oversimplified guide. (Thank goodness that ten minutes business is pure bunk.) The book is perfect for the casual Mac user who doesn't much care about what's going on behind the scenes. McQuillen doesn't just italicize a techie term and assume you can glean its meaning; instead, he presents a complete and helpful definition in a sidebar. This is the only book that bothers to define *megabyte*.

The *10 Minute Guide* (Sams, \$9.95) skimps on file sharing, there are glitches in the book's graphics, and the advice to convert all your fonts to Apple's TrueType is a little fishy. Otherwise, the guide is a rare combination of good writing and technical expertise.

Using the Macintosh With System 7

Here, too, the schlocky cover does a disservice to the scholarly contents (Que, \$24.95). Lavona S. Rann has written a full-fledged textbook: painstakingly thorough, well organized, sometimes too dry. What keeps her book from being another Apple manual is that the user's viewpoint is well represented—and that the outstanding "Troubleshooting" chapter acknowledges far more potential for snafus than Apple ever would.

Rann is a better writer than she is a technician; a handful of errors have crept

into the text. And the book would appeal to the non-power user more if terms were defined when introduced: *driver*, *directory*, and the abbreviation *M* fly by as though we all knew what they meant. Otherwise, this book qualifies as the most complete and best-written guide for the novice.

The Little System 7 Book

This slim volume tries to capitalize on the popularity of Robin Williams's *The Little Mac Book*; it's from the same publisher and even uses the same page layout. And, as in *The Little Mac Book*, the tone is so breezy you can feel your hair ruffle.

You may find this casual approach refreshing: "Commander Find will find all of [your files]. He'll even locate items in different folders." I can't help feeling that some of the energy put into cuteness should have been spent on accuracy. Author Kay Yarbrough Nelson's editors let a few too many slips get by, including calling the Startup Items folder a control panel and directing you to the nonexistent Color menu. Still, if terms like "Secret Scrolling" and "Magic Sorting" makes System 7 easier to grasp, you won't mind a few Little Mac Bloopers (Peachpit Press, \$12.95).

Macworld Guide to System 7

Lon Poole is *Macworld*'s reigning hint-and-tip guru, so it's no surprise that his book is the hint-and-tippiest of them all (IDG Books Worldwide, \$24.95). I mean, this guy can make System 7 jump through hoops, walk on its hands, and yodel. For what it's worth, no other book tells you how to zoom in on the Map control panel, replace the picture in the Puzzle desk accessory, or put fonts into a suitcase under System 7 without the Font/DA Mover.

The crisp gray-scale illustrations are sensational, although some screen shots are too enlarged (the Edit menu needs a half page?). The short, concise sentences seem to say, "No time to editorialize; there's just too much cool stuff to show you!" There's no installation guide, nothing on Mac basics; this is a handbook for the knowledgeable Mac user who wants to jump right into the juiciest parts of System 7. Free updates are supposed to be included in the purchase price.

System 7 Revealed and Programming for System 7

Help, I'm out of space! But these are smartly written, authoritative books for programmers (Addison-Wesley, \$22.95 and \$26.95, respectively). Even I understood some parts.

The Upshot

It's a tough call; there's something worthwhile in almost all of these books. For the new-to-the-Mac: I'd take either the *10 Minute Guide* (for brevity), *Using the Macintosh* (for completeness), or *The Little one* (for breeziness). For the average user: definitely *The Macintosh Bible* or the *Macworld Guide*, since each comes with a money-back guarantee. For the RAM heads: the *MacWeek Guide* (pithy) or *Everything You Need* (immense). Look over the table above to get a feel for each book's coverage of special topics. And may all your programs be compatible. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE admits partial responsibility for the deluge of Mac books, having contributed to the *Macworld Read Me First Book* (IDG Books Worldwide, 1991).

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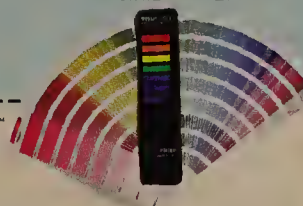
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Accel-a-Writer Upgrades

Family of PostScript-compatible upgrade controllers that offer Intelligent Simultaneous Interfacing and Advanced Memory Management technologies, which lets users allocate memory to increase printer resolution, increase processing speed, or allow more virtual memory to download fonts. Available in three versions. Accel-a-Writer V upgrades the HP LaserJet series IIP, Accel-a-Writer VI is for the series III printers, and Accel-a-Writer VII upgrades the series IIIP printers. 300-dpi controllers \$1295; 600-dpi controllers \$1695. Xanté, 205/990-8189; fax 205/476-8189.

Data Cannon II

Fast SCSI-2 coprocessor board, designed for use with MacinStor high-capacity hard drives. Company claims board and drive combination will more than double the data-transfer rate when used with a Quadra 700 or 900, and support sustained data-transfer rates of up to 10MB per second. Board also supports SCSI and SCSI-2 standards and command sets, works with internal or external storage devices, and provides an additional

Fast SCSI-2 bus, allowing user to chain seven more SCSI devices to the Mac. Board also functions as a coprocessing bus master able to off-load disk I/O functions from the CPU. \$999. Storage Dimensions, 408/954-0710; fax 408/954-0517.

The Diskless Macintosh

ROM upgrade and software package that allows Macs on a thick, thin, or twisted-pair Ethernet network to act as diskless workstations, operating without a hard drive or a floppy drive. When the Mac starts up, software initiates a shared start-up volume as a RAM disk, booting from a disk image of a standard system, stored on the shared disk. Many different system images can be created for use over the network, as defined by the system administrator. Product supports A/UX and standard Mac operating systems. 2MB min. memory. \$149. Sonic Systems, 408/736-1900; fax 408/736-7228.

Infinity Floptical 21MB

Disk drive that reads and writes 21MB, barium ferrite floptical disks, as well



Infinity Floptical 21MB

as 1.44MB Macintosh formatted, and 720K and 1.44MB DOS formatted disks. SCSI interface provides for error correction and mapping not typical of standard floppy drives and allows access times twice as fast as those of floppy drives, according

to company. Floptical disks are stamped with optical servo tracks that cannot be erased and are used to align the drive's magnetic heads. \$699; 21MB floptical disk \$49. PLI, 415/657-2211, 800/288-8754, fax 415/683-9713.

MacinStor Hard Drives for Quadras

Line of 11 internal hard drives for Quadra family with capacities from 60MB to 1335MB. Drives are preformatted, with System 7 installed, and are compatible with company's Data Cannon NuBus SCSI coprocessor board, which can be added to increase system disk throughput. Models for the Quadra 700 are 3 1/2 inches high and those for 900 are 3 1/2- or 5 1/4 inches high, depending on capacity. Drives also ship with installer software that includes mirroring, volume spanning, automatic reallocation of bad blocks, partitioning, diagnostics, and formatter functions. For Quadra 700 \$639 to \$3069; for Quadra 900 \$1509 to \$7839. Storage Dimensions, 408/954-0710; fax 408/954-0517.

Maxtor 535MB SCSI Drives

Portable hard drives available in external SCSI or internal models. The mechanism manufacturer claims that drives have a 12ms average seek time, support SCSI transfer rates of up to 6MB per second, and have a mean-time-between-fail-

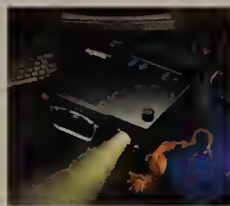


Maxtor 535MB SCSI Drives

ure rate of 150,000 hours. Ships with Alliance Power Tool version 2.0 for partitioning and formatting. Internal \$1599; external \$1749. APS Technologies, 816/478-8300, 800/235-2752; fax 816/478-4596.

nSight

Monochrome LCD data projector compatible with all Macintoshes for presentations, with a built-in light source and an image resolution of 640 by 480 pixels. Projector utilizes double supertwist LCD technology and projects images in 16 shades of gray; uses a standard

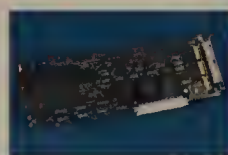


nSight

35mm slide projector lens that can be replaced with other lenses for varying projection distances and image sizes. Built-in control panel on device allows user to adjust focus, contrast, and image positioning; also comes with a remote control and choice of one cable set. \$2195. nView Corp., 804/873-1354, 800/736-8439; fax 804/873-2153.

nuStep

Three-axis stepper-motor NuBus board that is a general-purpose motion controller. Compatible with full-step, half-step, and microstepping motor drives. Provides accurate open-loop or closed-loop motion control with a programmable step rate and a command set of more than 40 high-level functions. Board is based on a 68000 microproces-



nuStep

sor and can be programmed in LabView 2, C, and other languages. \$1595. nuLogic, 617/444-7680; fax 617/444-2803.

RGB/Videolink 1600U

Autosync scan converter that transforms high-resolution computer graphics into NTSC or PAL format. Automatically synchronizes to any computer signal with a horizontal scan rate from 20kHz to 90kHz. Unit has a direct interface to video projectors and other display equipment and offers antialiasing, 24-bit color processing, and a zoom function for displaying an entire screen or window. \$19,495. RGB Spectrum, 510/848-0180; fax 510/848-0971.



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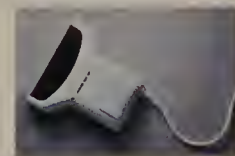
SelectSet 7000

PostScript image recorder that produces film up to 22 inches by 25.7 inches, allowing for the production of fully composed films for larger-format presses directly from layout files. Recorder uses drum- and pin-registration technology to ensure precise separation alignments; also implements company's OptiSpot technology, which adjusts the laser spot size according to the desired output resolution. The device's Star Plus SX raster image

processor (RIP) is designed specifically to speed the processing of large data files. The Company's Agfa Balance Screening Technology allows moiré-free screening. \$165,000. Agfa, 508/658-5600; fax 508/658-3285.

SpeedReader

Hand-held, black-and-white, 800-dpi scanner with a scan width of 4.13 inches and resolution that is adjustable in increments of 100 dpi. Includes software for optical character recognition, painting



SpeedReader

tools, and a merge function. Connects to the Mac through the SCSI port. 1MB min. memory. \$399. Animas Corp., 510/656-1117; fax 510/656-4409.

VuPort

Interface that connects Panasonic AG-1960 professional editing VCR to the Mac through a serial port. Each VuPort can control up to two VCRs, and you can daisy-chain multiple VuPorts together. Software must contain a VuPort driver to access device's VCR controls, which include cue-to-frame editing, insert edits, preroll play, and VCR status reports. \$749. Selectra Corp., 510/283-1670, 800/874-9889; fax 510/284-2117.

SOFTWARE

Create Review Test

Study aid that lets students enter class notes, questions, and answers. *continues*

Program leads students through review and self-testing while automatically tracking study areas needing the most work, then concentrates testing on areas of weakness. Also has on-screen help and intuitive features guide. Targeted for students age 10 and up. Introductory price of \$35.50 offered through the end of the school year (May 1992). 256K min. memory. \$73. Marco-Soft, 708/554-2650, 800/245-0356; fax 708/554-2807.

Graphical Analysis

Graphing program for high school and college science classes; designed to help students use graphical methods to analyze experimental data, which can be entered directly into the program or imported from text files. The data is graphed as it is entered, and can be modified mathematically to help search for relationships between variables. The program includes logarithmic, trigonometric, and delta functions; can include a best-line fit with any graph; and supports

multiple graphs on screen that can be scaled and styled to best display data. 1MB min. memory. School site license for one class \$49.95. Vernier Software, 503/297-5317; fax 503/297-1760.

In Control

List manager that helps user organize projects and priorities by using a collapsible outline or a row-and-column format to organize data. User can create an unlimited number of columns to track due dates, priorities, resources, and so on. A sort function arranges data by



In Control

column heading, and a match function finds items that meet a specific criterion, enabling user to view all tasks due on the same date or related to a particular project. The layouts feature lets the user customize column order and print out to-do lists,

assignments, progress reports, and status reports. 512K min. memory. \$129.95. Attain Corp., 617/547-2188; fax 617/547-2188.

Inspiration

Visual diagrammer for use in project planning, flow charting, tree charting, creating presentation visuals, and laying out storyboard concepts. Program can also create top-down diagrams and can convert diagrams to outlines for use in written plans, reports, and stories. 1MB min. memory. \$295. Ceres Software, 503/245-9011; fax 503/246-4292.

Landview

Application that creates mapping contours by importing 3-D coordinates—from Landesign, spreadsheets, and other programs—and triangulating the data using a TIN (Triangulated Irregular Network) method. TIN is an algorithm that performs a linear interpolation between each data triangle to determine how to draw the contour lines. User can download data

measured in the field using Landesign's data collector module. Landview can also export contour maps in PICT format. 1MB min. memory. \$195. Compunearring, 416/738-4601; fax 416/738-5207.

Leads

Family of three sales applications that can work independently or together to automate the process of collecting, managing, pursuing, and analyzing sales leads. Allows user to maintain event histories for each lead; schedule follow-up actions and call backs; and generate mail merge letters, envelopes, and labels. 1.5MB min. memory. Leads Personal \$595; Leads Manager \$995; Leads Corporate \$1795. Endpoint Marketing Information Systems, 408/737-3831; fax 408/737-5979.

MacSwell

Software for use with System 7 that allows the user to allocate more than 97.56MB (System 7's limit) of physical or virtual memory to any application. Designed especially

for Adobe Photoshop users who must have available RAM equal to three times the size of the image they are working with to work at an acceptable speed. Opening an application in MacSwell brings up a Get Info box so user can allot RAM and then launch the application. 97MB min. memory. Bundled with 16MB SIMMs \$950. Newer Technology, 316/685-4904, 800/678-3726; fax 316/685-9368.

NEC Video

Sequencer for Mac Application that controls two PC-VCRs and allows users to log video segments into a visual database and create a segment list for editing video on the Mac's screen. Once clips are logged, user can click and drag sequences into a program log to build video presen-



NEC Video Sequencer

tations. Software uses segment list to automatically assemble a master videotape and can export a CMX-style edit-decision list for final production on other video systems. Also offers on-screen video-in-a-window capability through support of RasterOps video-capture boards. PC-VCRs are connected through a serial port. Requires a Mac II or higher. 5MB min. memory. \$595. NEC Technologies Professional Systems Division, 708/860-9500, 800/366-3632; fax 708/860-5812.

RateFinder

Provides local, national, and international mail and freight-shipping rates for UPS, Federal Express, U.S. Mail, and other carriers. Sample Airborne Express rates are also included, but users must enter Airborne Express rates for their particular region. Users can also enter an unlimited number of other carriers' rates. A totals window allows addition of carrier's special charges (Saturday delivery, priority rates, and so on) for calculating com-

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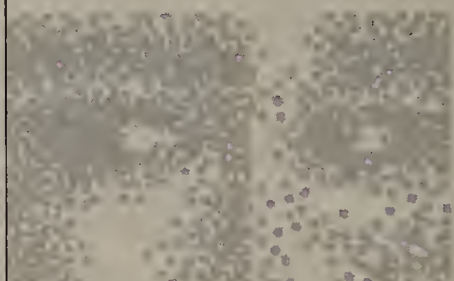
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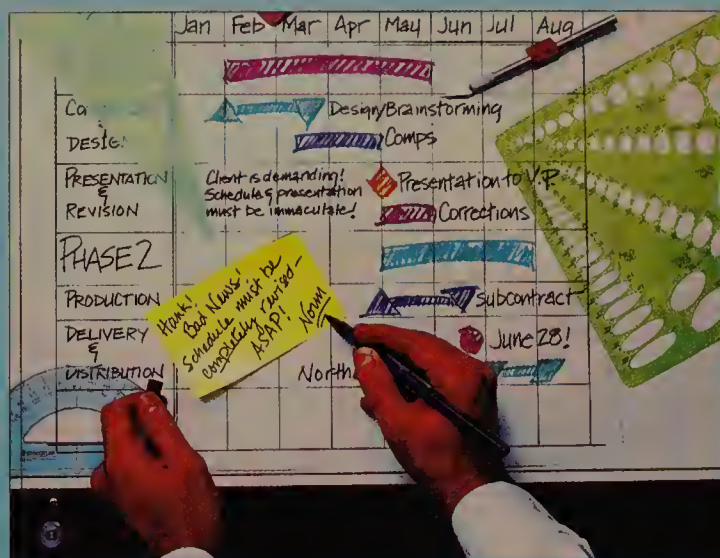
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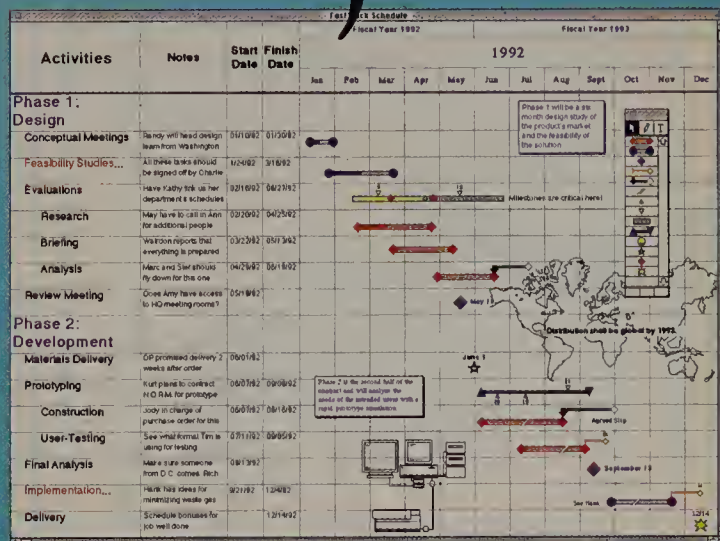
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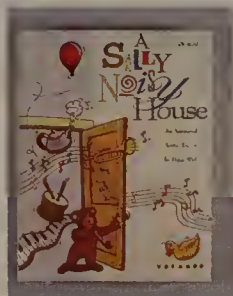
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A Silly Noisy House

playing spider, rhymes, and tongue twisters. Includes more than 250 digitally recorded sounds and is designed to introduce children to the Mac while they play. 3MB min. memory. \$59.95. Voyager, 310/451-1383, 800/446-2001 outside CA, 800/443-2001 in CA; fax 310/394-2151.

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Backgrounds for Multimedia Volume 2

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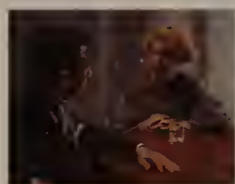
ClipTime, Volume One
First in a series of CD ROMs containing hundreds of professionally produced movie clips in QuickTime format, for use in presentations, advertising mock-ups, marketing demonstrations,

and other applications. 4MB min. memory. \$199. Alpha Technologies Group, 410/781-4200; fax 410/781-4963.

Multi-Educator American History
Multimedia program designed to encourage students to learn about American history interactively through use of the program's graphics, sound, and text. The disc includes more than 400 photographs, 150 graphics, 100 maps, 50 historic documents, and recordings of presidential addresses. Students can travel through history chronologically or alphabetically, browsing topics from American Indians to Desert Storm. Also available on floppy disks. 4MB min. memory. Without sound \$49.95; with sound \$79.95. Computer Vistas Unlimited, 914/654-9717, 800/866-6434; fax 914/235-5131.

MultiMedia Handisc
A multimedia handbook on CD ROM with tutorials, demonstrations, product and service directories, and a hypertext glossary with more than 1000 definitions. Has libraries of color buttons, background graphics, photos, animations, sounds, music, HyperCard stacks, QuickTime movies, and multimedia programs; ships with QuickScreen, a screen recorder that uses the QuickTime format. Also contains CD Audio DJ, a program that lets users play back audio CDs from within MacroMind Director and Paracomp FilmMaker. 4MB min. memory. \$99. CD Technology, 408/752-8500; fax 408/752-8501.

Sherlock Holmes, Consulting Detective
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Sherlock Holmes, Consulting Detective

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player takes the role of Sherlock Holmes. The player as Sherlock interacts with 50 different characters and is challenged to use logical thinking and deductive reasoning to create a case against the suspected murderer. Player uses icons to consult a directory of locations, review a notebook, read newspaper articles, and interview Baker Street regulars in order to garner clues and information. 2MB min. memory. \$69.95. ICOM Simulations, 708/520-4440; fax 708/459-3418.

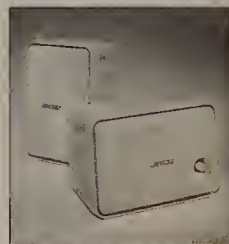
The Treasure Chest

Contains thousands of programs on CD ROM and a database of Macintosh software to facilitate searching for specific programs and comparing features and prices. Each program is locked and can be used only with an access code that the company gives out after user places an order for that program. \$39. Quantum Leap Technologies, 305/885-9985, 800/762-2877; fax 305/885-9986.

ACCESSORIES

Bose Roommate Computer Monitor

Pair of powered speakers with built-in volume control, designed to be used with personal computers. Speakers measure 6 inches by 6 inches by 9 inches. Pair uses HVC



Bose Roommate Computer Monitor

driver and proprietary distortion-limiting circuitry. Unit also contains an amplifier and active equalization circuitry. \$399. Bose Corp., 508/879-7330, 800/444-2673.

Deluxe Footrest

Portable therapeutic footrest designed to alleviate back stress and promote circulation to the legs. Has wooden rollers meant to massage the feet as they rest on unit. Available

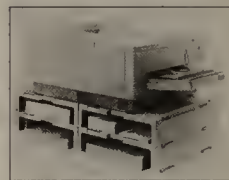
with a walnut or teak finish. \$69. BackSaver Products, 508/429-5940, 800/251-2225; fax 800/443-9609.



Deluxe Footrest

MediaMate LaserRak

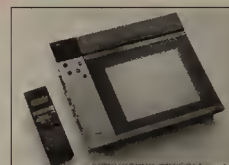
Printer stand measuring 11 3/4 inches by 17 inches by 3 1/2 inches, with four shelves for storage of legal- and letter-size paper, paper trays, and other items. \$39.95. Hunt Data Products, 215/732-7700; fax 215/875-5252.



MediaMate LaserRak

QA-1050 TFT

Projection panel for computers that can display 185,000 colors, has full-motion capability, and uses a full 640-by-480-



QA-1050 TFT

dot TFT (Thin Film Transistor) LCD. Panel has a display time of 30 fps and contains an EEPROM that holds setup adjustments in memory when the power switch is off. A 19-key infrared wireless remote-control unit is included and has functions that clear, adjust, enlarge, and compress images. Connects to VCRs, video-disc players, and cameras with an adapter available from company. \$6500. Sharp Electronics Corp., 201/529-8731; fax 201/529-9636.

Quick Reference Cards

Series of silkscreen vinyl cards roughly the size of a mouse pad, that list steps necessary to complete commonly used tasks in a variety of applications, including Microsoft Excel, Aldus PageMaker, Microsoft Word,

and System 7. Cards are printed on both sides, and each card focuses on one specific program. \$3.99 per card. GMT Automation, 617/242-9263, 800/524-1680; fax 617/242-1309.

BOOKS

Information Security Policies Made Easy

How-to guide on security policies that comes in both disk and hard-copy form and contains 525 policies that can be used to develop security materials such as manuals, system development procedures, and outsourcing agreements. An extensive introduction describes why policies are critical to security, how to get management support, and how to write policies to foster compliance. Policies in the book cover network security, computer viruses, software development, password management, and privacy. Written by Charles Cresson Wood. \$495. Baseline Software, 415/332-7763, 800/829-9955; fax 415/332-8032.

Introduction to VersaCAD Macintosh

A complete reference and tutorial on VersaCAD Macintosh with exercises, examples, and coverage of traditional engineering graphics topics, including geometric construction, multiview projection, and dimensioning. Company maintains an E-mail address; publishes a quarterly newsletter to support users. Written by Steven R. Foster. \$42.67. Prentice Hall, 201/592-2000; fax 201/592-2275. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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End users circle 3 on reader service card



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MACWORLD

Questions and Tips from Macworld Readers

BY LON POOLE

APPLE'S COMPATIBILITY checker tells you how compatible your software is with System 7 (as explained in December's *Quick Tips*), but it fails to analyze one important category of programs, desk accessories. For instance, Fred Schreiber of New York says Compatibility Checker has yet to take account of QuickDex II, the well-known database DA. "What is more, I find this category mentioned nowhere in Apple's documentation nor in any of the several books that have come out recently—including your own," he writes.

Compatibility Checker 1.1 (the latest at this writing) completely ignores desk accessories, probably because there's no way to positively identify most of them. Compatibility Checker, like the Finder, identifies programs not by name (which anyone can change) but by a four-letter creator code. Under System 6 and earlier systems, desk accessories had to be either installed in the System file or stored in suitcase files and could not have unique creator codes. Under System 7, most desk accessories have the same creator code, that of Font/DA Mover, when you drag them out of their suitcase files. QuickDex II and some other desk accessories introduced after System 7 do have unique creator codes, but Compatibility Checker 1.1 does not check for them. Incidentally, the creator code links a program to its icon so desk accessories with the common creator code must have the same icon.

Besides ignoring all desk accessories, Compatibility Checker keeps a list of more than 100 other items that it doesn't check (see "Never Mind That"). These include installers, software packaged with an application that Compatibility Checker already checks, and items replaced when you upgrade to System 7.

Unfriendly Flicker

Q I want to record images from my RasterOps 19-inch monitor with my Sony 8mm camcorder for teaching purposes. When I try, scan bars move vertically and interrupt the image. How

can I synchronize the screen and the camera to get a clean image?

*Sol Ewen
Great Neck, New York*

A You see the rolling flicker because a video camera scans at a different frequency than a computer monitor does. To solve the problem on a RasterOps monitor or on any monitor connected to a RasterOps video adapter board, get the SyncCamera utility software from RasterOps (800/729-2656).

System 7, the Memory Hog

Q I recently upgraded to System 7 and have found that it is a memory hog. My previously spacious Mac II with 5MB of RAM now has less than 2MB for applications (ImageStudio barely fits), and this is after installing the Mac II-only software so as not to install any more system software than I need. I've removed fonts and sounds but system software still takes more than 2700K. What else can I do to reduce the memory needed by system software? It might help to know which items from the System Folder are loaded in at start-up time.

*Rod Martin
Ames, Iowa*

A You can reduce the system software's memory size (as reported by the About This Macintosh command) to its minimum (1160K on my system) by pressing the shift key while restarting the Macintosh. Look for the message "Extensions Off" during start-up. It confirms that you have suppressed loading of all items in the Extensions folder, Control Panels folder, and System Folder that would increase the system software's memory size. You have also bypassed opening items in the Startup Items folder, reduced the RAM cache to 16K, forced virtual memory off, and prevented file sharing from start-

ing. To make persistent changes you must drag items out of the special folders and change settings in the Memory and File Sharing control panels.

All items listed as system extensions in a By Kind view of the Extensions folder or System Folder—except PostScript fonts—increase the system software's memory size during start-up. So do some other items, but not Chooser extensions for printers (LaserWriter, StyleWriter, ImageWriter, and so on), communications tools, MNPLinkTool documents, Finder Help, or the PrintMonitor application. Control panels that display an icon at the bottom of the screen during start-up (or offer the option of doing so) have system extensions built in and increase the system software's memory size. Control panels that don't display start-up icons generally don't increase system software's memory size, though there are exceptions, such as Easy Access.

The amount of memory you recover by removing a particular item from the Extensions folder, Control Panels folder, or System Folder depends partly on what items remain, so you have to experiment. On my system, for example, Adobe Type Manager 2.0.2 adds 193K, QuicKeys 2.1.1 with CE Toolbox 1.6.4 adds 209K, and After Dark 2.0v adds 108K. Other items have smaller memory appetites. Easy Access 7.0 adds only 12K and Capture 4.0 adds 22K, for instance. Compare the system software's memory size before and after removing an item, and weigh the potential memory savings against the benefit the item provides.

For big memory savings, you should turn off file sharing and virtual memory if you're not using them. (I recoup 267K from the first and 380K from the second.) Reducing the RAM cache size reduces the system software's

continues



*Reducing
System 7
memory use,
taking
Macs overseas,
scaling
custom fills in
FreeHand 3.0,
and more*

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—Heidi Roizen,
CEO, T/Maker Company

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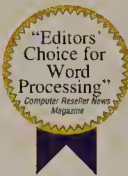
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Default Memory Setting	475K	2,048K

You see, WriteNow 3.0 is written entirely in assembly language (the native language of the Macintosh), so it's *highly optimized*.



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memory size K for K—and slows system performance.

Fonts and sounds installed in the System file enlarge the System file on disk but don't increase the system software's memory size. Desk accessories don't increase the system software's memory size during start-up but generally do so when you open them.

Stubborn Icons

Q I put System 7 aliases of my frequently used applications and folders along the right edge of the screen so they are always accessible with one or two mouse clicks. I also squeeze my hard drive icons into the upper-right corner of the screen, but they return to their standard widely spaced positions every time I restart the computer. How can I tell the Finder where to place disk icons?

Bill Wilson
Bellaire, Texas

A You can't. The Trash icon stays where you put it, but disk icons do not. You could use the timer options in CE Software's QuickKeys to move the icons automatically each time the Finder starts. Or you could create aliases of your permanently mounted disks and put those aliases (and aliases of frequently used items) in a folder that you leave open in small-icon view at the upper-right corner of the desktop. This scheme has a drawback, though: when you insert a floppy disk or another removable disk, its icon appears on the desktop rather than in your folder of aliases.

Foreign Power

Q My husband and I are moving to Germany and would like to know if we'd be better off taking our Mac Classic and StyleWriter with us or buying a comparable configuration overseas. Can we use an external power adapter, or must the Mac's internal power supply be altered for 220-volt, 50Hz German electrical power? If we bought a new system overseas, could we run our American applications and system software on the European machines?

Gabrielle Johnson
Sacramento, California

A Many Apple products have universal, self-adjusting power supplies and only need a plug adapter from Radio Shack or a hardware store to work anywhere in the world. To use your U.S.-bought Classic and StyleWriter with 220-volt power, though, you need a good-quality grounded isolation step-down transformer that changes 220V/240V to 110V/120V. The transformer does not change the frequency, which is

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TM578

4D Customizer	ImageWriter	Portable Profiler
4D External Mover	INIT Tracker	PrintMonitor
4D Tools	INITLoader	Quicken to MacInTax
IIfx Serial Switch	Installer 7.0	Export
ABKey (KidsTime)	Installers	QuickInstall
ADSP	Instrument Maker	Reading Maze
AGXit (Persuasion)	(ConcertWare)	Responder
Aldus Installer	IQShell (before CD ROM)	ResponderINIT
AME Tools	Keyboard	Retrospect Updater
A.M.E. Utility	KidsMath	SAM Exceptions Copier
American Discovery	KidsNotes (KidsTime)	(SAM 3.0)
AppleShare 6.0.7	Labels	Scanner (Apple)
AppleTalk ImageWriter	LaserWriter 1.0-5.0	Self-Extracting Archive
A/ROSE	LaserWriter 5.2-6.0.1	(Compact Pro)
Brightness	LaserWriter 7.0	Self-Unstuffing Archive
Canvas Separator 1.0	LaserWriter II SC	(StuffIt)
CD Remote INIT	Layout Plus (Norton Utilities)	Sharing Setup
CloseView 6.0.7	LQ AppleTalk ImageWriter	Sound
Color	LQ ImageWriter	Sound-to-Video II
Cricket Installer	MacApp code	Speed Disk
Dialog Editor	MacroMind movie	(Norton Utilities)
Disk Lock Emg. Unlock	Map	Startup 6.0.X
Disk Lock Installer	Match-It (KidsTime)	Startup Disk
DiskLight (Norton Utilities)	Memory	StyleWriter
DL Folder Lock	MITEM modules	SUM Backup
Document Readers	Monitors	SUM Disk Clinic 2.0
Dot-To-Dot (KidsTime)	More Graph	SUM Encrypt
Easy Access	More Library Mover	SUM Install
Fax Center	MountImage	SUM QuickCopy
File Sharing Extension	Mouse	SUM Recover
File Sharing Monitor	MT Player (Media Tracks)	SUM Tune Up
FKey Manager	Music Player (ConcertWare)	SuperEdit
Font & Sound Valet	Network	Table Editor (PageMaker 4)
Foreign File Access (Apple	NumberMaze	TOPS DA installer
CD ROM)	NumberMaze D&F	TOPS Translators
Forms Installer for Status Mac	Omnis 5	Users & Groups
FoxInstall	Personal LaserWriter SC	Views
Gallery (Studio/1, /8, /32)	Personal LW LS	WingzAid for 6.0.5
General 6.0.X	Personal LW LS Prep	°Remote for Retrospect
General Controls	Portable cdev 6.0.X	- AL Compression

Never Mind That Compatibility Checker 1.1 skips all these items when it checks software on your disks for System 7 compatibility. It also ignores all desk accessories and all applications whose creator code is unknown or unspecified ("?????" or blank).

60Hz in North America and 50Hz in Europe. Most Apple products work on either frequency. "Power Needs" lists the electrical requirements of most Apple Mac-related products in use at this writing. If you have non-Apple products such as hard drives, printers, scanners, or monitors, check the nameplate or owner's manual for acceptable voltage and frequency ranges.

Your transformer should be rated to handle the total wattage of everything you attach to it. If you use a cheap voltage converter, it will ruin your equipment. You may be able to find a transformer at a local electronics supply store, or you can order one from Electronics Plus (415/457-0466, 800/321-4524). Also, take

along a multioutlet power strip with surge protection. You'll have a tough time finding one outside the United States.

If you buy a Mac in Europe, you can still use the system software and applications that you bought in the U.S. (You might have trouble with some applications if you try to use the foreign system software, however.) Beware: the configuration of keys on foreign keyboards doesn't match the key layout set up by the U.S. system software. Some foreign keyboards even have a different number of keys than the U.S. keyboard does. You will probably be happier if you take a U.S. keyboard with you to plug into the foreign Mac.

continues

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Easy Renaming

TIP: Despite all the ranting and raving about how you have to wait to re-name an icon in System 7, I've found a supereasy shortcut. Simply click anywhere within the name of the icon, and as soon as you release the mouse button, move the pointer slightly. The name is immediately ready for editing.

Vito Mazzariello
Valatie, New York

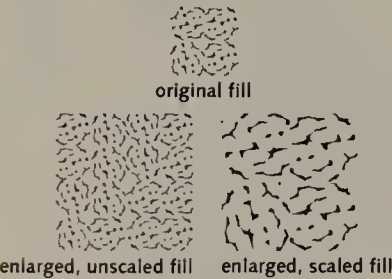
Excel Gets Small

TIP: Microsoft Excel 3.0's suggested memory size is 1536K. It doesn't need to be anywhere near this high from what I can discern. If you rarely make use of Excel's charting features because, like me, you spend most of your time working with spreadsheets, you can safely reduce Excel's memory allocation to as low as 512K. I set it at 900K because I have some spreadsheets that won't open at 512K. Lowering Excel's memory size allows you to have more applications open under System 7 or System 6 with MultiFinder.

By the way, if you ever wondered what Excel's developers think of Lotus 1-2-3, try this. Open a new worksheet and zoom it to full size. Hold down the shift key and drag the vertical scroll box to the very bottom of the scroll bar. With the shift key still down, drag the horizontal scroll box to the far right. You should now see only one cell in the upper-left corner,

Scaled Fill

Aldus FreeHand 3.0 doesn't normally scale a custom fill such as Coquille, Mezzo, Denim, or Burlap. To scale a custom fill, Sue Ann Sanders of Oak Creek, Wisconsin, suggests you first draw or select a closed path and use the Fill And Line command to apply the custom fill you want to scale. With the path still selected, choose Group from the Element menu. Then choose Element Info from the Element menu and turn on the Group Transforms As Unit option. Finally scale the path with the scaling tool.



POWER NEEDS			
Apple Product	Voltage Range	Frequency Range (in Hz)	Maximum Watts
ADAPTER PLUG REQUIRED (NO TRANSFORMER REQUIRED)			
Macintosh SE	85-270	47-63	100
Macintosh SE/30	120-240	48-62	75
Macintosh LC	90-240	47-63	50
Macintosh II, some IIfx	90-140 and 170-270	48-62	230
Macintosh IIfx	100-240	48-62	230
Macintosh IISI	120	47-63	100
Macintosh IICx, IICI	100-240	48-62	90
Macintosh Quadra 700	100-240	50-60	50
Macintosh Quadra 900	100-240	50-60	303
Macintosh PowerBook 100, 140, 170	110-220	50-60	NA
Macintosh Portable	85-270	48-62	15
High-Resolution Monochrome Monitor	85-270	50-60	40
12-Inch Monochrome Display	90-132 and 190-270	47-63	30
Portrait Display	90-270	47-63	75
Two-Page Monochrome Monitor	90-270	47-63	95
12-Inch RGB Display	100-120	50-60	90
High-Resolution RGB Monitor	85-270	47-63	90
21-Inch Color Display	85-135 and 170-270	47-63	165
Apple HD20SC	85-270	47-64	30
Apple HD40SC, 80SC, 160SC	85-270	47-64	60
AppleCD SC	85-270	47-64	40
AppleCD SC Plus	100-240	50-60	40
ISOLATION STEP-DOWN TRANSFORMER REQUIRED FOR 220/240 VOLTS			
Macintosh Classic, Classic II	120	47-63	100
Macintosh 128K, 512K, 512KE, Plus	107-137	50-60	60
StyleWriter	100-120	48-62	23
ImageWriter I	107-137	50-60	180
Personal LaserWriter LS, NT, SC	100-115	50-60	600
LaserWriter IIf, IIG, IISC, IINT, IINTX	90-126	50-60	900
Apple OneScanner	99-121	58-62	45
ISOLATION STEP-DOWN TRANSFORMER REQUIRED FOR 220/240 VOLTS*			
ImageWriter II	107-137	60	180
ImageWriter LQ	107-137	60	180
LaserWriter, LaserWriter Plus	104-127	60	760
Apple Scanner	107-137	60	65

*Not recommended for use with 50Hz power.

cell IV:16384. Select it (click it once). Now choose Row Height from the Format menu and click the Hide button. Then do the same with Column Width. Finally, double-click the square that remains in the upper-left corner of the window and watch the fun. Press ⌘-period (.) to stop.

David Thompson
Mississauga, Ontario, Canada

Don't worry about setting an application's memory size too low. When you close an application's info window the Finder warns you if you've set a size that is lower than the minimum size recommended by the application's developer—512K in Excel's case. (To see an info window, select an application icon and choose Get Info from the Finder's File menu.) Because the info window doesn't show the minimum memory size, you have to find it by trial and error unless you

know how to use the ResEdit utility program. In ResEdit, you open the SIZE -1 resource and scroll to the bottom of its window, where you see the minimum memory size listed in bytes (divide by 1024 to convert to K).—L.P. **m**

We pay from \$25 to \$100 for tips published here. Send tips or questions (include your address and phone number) to *Quick Tips*, *Macworld*, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (294-8078). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

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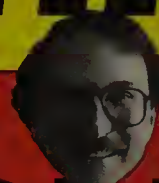
THE HASSLE IN THE CASTLE

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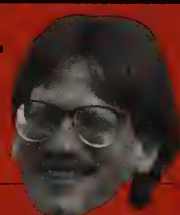
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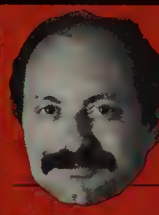
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Color Output

BY JIM HEID

COLOR IS COMPELLING. COLOR can convey messages and information—think of a traffic signal or the color-coded wires in a piece of equipment. Color can convey moods—contrast the muted grays of a corporate headquarters with the vibrant reds and yellows of a fast-food joint. Color can show quantitative changes—consider how maps indicate mountain ranges with darker shades of green. Color can attract attention—how many gray neon signs have you seen? And color makes images more realistic—the way we see them in the real world.

Most Macs can display up to 256 colors, and some can display millions. So why is it that most color Macs are connected to black-and-white printers? For one thing, many people just don't need color—on paper or on the screen. If you work primarily with text and numbers, color isn't important. It can be undesirable, since a Mac runs slower in color than it does in black and white. Color output isn't even essential if you're a desktop publisher working with spot color (color accents such as red headlines and blue boxes). You can still preview colors on the screen, and when you take the document to a printshop, you supply several black-and-white pages anyway—one for each spot color you're using. The printshop then makes a separate printing plate to apply each required ink color.

Although there are some good reasons to consider a color printer, today's color printers have some serious limitations. And there are technical hurdles for publishing professionals who need consistent, accurate color output that matches what they see on the screen. Indeed, as you climb the ladder to increasingly demanding color applications, obtaining acceptable output becomes increasingly complex. This month, I explore the ways you can use color output and the key technologies and issues behind it. For reviews and test results of 25 color printers, see "Color Printer Progress" in this issue.

Colorful Applications

A FEW COLOR PRINTERS SELL FOR LESS than \$2000, but most cost between \$5000 and \$50,000. With prices like these, color

printers aren't for memos or mailing labels. So what are they for?

▪ **PRESENTATIONS** Color printer companies often tout studies that supposedly show how color visuals attract more attention and yield better retention than do black-and-white ones. Color does make charts, diagrams, and text stand out, especially when visuals are projected on a screen. Several types of presentation media are available; overhead transparencies and slides are the most common. You can make impressive color transparencies using just about any low-end color printer; to make slides, you need a *film recorder*, which uses photographic techniques to create 35mm slides or 4-by-5-inch transparencies. Color charts and diagrams also stand out nicely in reports, although most printers can't print on plain paper—more about that limitation later.

▪ **ENGINEERING AND ARCHITECTURE** Engineers use color coding to differentiate the various parts of a circuit design. Architects use different colors to indicate a building's heating, air conditioning, and plumbing systems. Both applications are often best served by *pen plotters*, specialized color printers that zip felt-tip pens across a sheet of paper.

▪ **SCIENTIFIC AND MEDICAL IMAGING** Research scientists might color code the various atoms in a molecular diagram. Physicians use color to differentiate organs in medical images. Astronomers add color to satellite and space-probe photos to convey quantitative information such as temperature variations in the atmosphere. (See last month's *Art Beat* for examples of how one photographer used color to highlight the parts of a tiny computer chip.)

▪ **GRAPHIC DESIGN** Package-design firms often manufacture mock-ups called *comps* that show clients how a new box or label design will look. These three-dimensional mock-ups may also be used in television commercials or print advertisements. Graphic artists also produce comps of printed pieces such as magazine layouts and brochures.

▪ **ELECTRONIC PHOTOGRAPHY** As we saw in last November's "Getting Started with Image Processing," photography is going digital, as more and more pictures are being stored on disk, rather than on film. And in the increasingly computerized publishing world, even conventional photos are likely to be electronically scanned in preparation for printing. Film recorders and a few high-end color printers can handle the demands of color photography and deliver photo-realistic results without chemicals and darkrooms.

Graphic design, publishing, and electronic imaging place the greatest demands on a color printer. Publishers and designers need printers whose colors match those of the printing inks that will be used to produce a final piece—and that match the colors the designers see on their screens. And to deliver photographic quality, a printer must be capable of producing *continuous-tone* images—ones whose colors blend smoothly, without the speckles and jarring color transitions that are common in the output of many printers.

Pigments and Spot Sizes

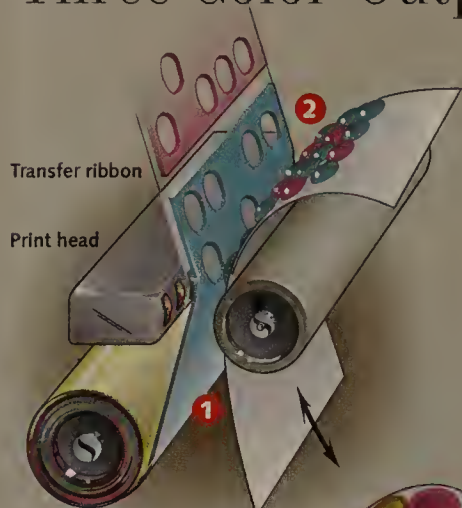
THERE ARE MANY WAYS FOR PRINTERS to put color on paper, but all involve applying pigments in three colors: cyan, yellow, and magenta. These *primary colors* are mixed to produce other colors. Equal amounts of cyan and yellow, for example, produce green, while equal amounts of magenta and cyan make blue. Equal amounts of all three primaries produce black, although many printers apply a separate black pigment to obtain richer blacks. This technique of mixing cyan, yellow, and magenta to produce colors and also applying black where needed is called *CMYK* or *process color* (the *K* stands for black). Color printing presses also use the same four ink colors and are often described as *four-color* presses.

A color printer's pigments can take several forms, from liquid ink that is sprayed through microscopic nozzles, to solid wax that is melted onto



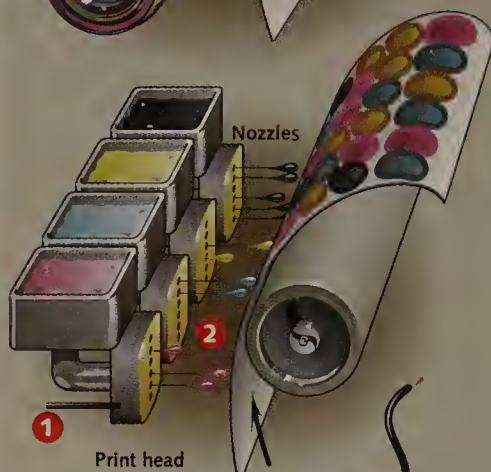
*How color
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Three Color-Output Technologies



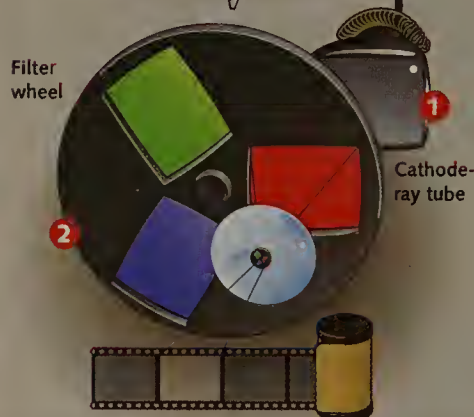
Thermal-Wax Transfer Printer

A thermal-wax transfer printer, such as Seiko's ColorPoint and QMS's ColorScript 100, contains a roll of transfer ribbon on which wax-based pigments in each process color (cyan, magenta, yellow, and black) are positioned one after another. The transfer ribbon is sandwiched between the print head, which contains thousands of heating elements, and the paper (1). The print head's heating elements are turned on and off to melt the wax as needed, causing individual dots to adhere to the paper (2). The paper passes by the ribbon and the print head four times, once for each process color.



Ink-Jet Printer

A color ink-jet printer, such as Tektronix's ColorQuick, sprays drops of ink onto the page through microscopic nozzles in the printer's print head. To spray a drop of ink, some ink-jet printers send an electronic signal to a piezoelectric diaphragm within the head (1), forcing a drop of ink from the nozzles (2). Others, such as Hewlett-Packard's HP DeskWriter C and HP PaintWriter, use a heating element to create bubbles that expand, forcing drops of ink from the print head. Because an ink-jet printer lays down all four colors in one pass, it poses fewer registration problems than do multipass printers.



Film Recorder

Unlike a printer, a film recorder uses red, green, and blue light to produce images on 35mm slide film. A controller board translates commands from the Mac into video signals and sends them to a high-resolution monochrome cathode-ray tube (1). A filter wheel (2) rotates to produce the required amount of each primary color, which travels through a lens and into a camera adapter that attaches to the front of the film recorder. With the proper adapter, a film recorder can also accept 4-by-5-inch Polaroid print or transparency film.

the page by heated rollers. Because of this variety in *marking* technologies, color printers are categorized according to the makeup of their pigments: *ink-jet* and *phase-change ink-jet* printers, *thermal-wax transfer* printers, and *dye-sublimation* printers. There are even a few color laser printers, which apply powdered toner in four colors. Guess which four. (For details on how ink-jet printers, thermal-wax printers, and film recorders work, see "Three Color-Output Technologies"; for details on the other types of printers, see "Color Printer Progress," in this issue.)

But what type of pigment a color printer uses is only part of the story. Many other characteristics set printers apart. One is *resolution*—the number of dots per inch (dpi) the printer can produce. Low-

end color printers such as Hewlett-Packard's PaintWriter can produce 180 dpi, which is adequate for graphics such as charts and diagrams, but yields somewhat chunky results with text. Most midrange and high-end printers have resolutions of 300 dpi, putting their text quality in the laser printer league. Film recorders are the sharpest, with resolutions of up to 4000 dpi. A printer's resolution helps determine how well the printer handles the subtle color transitions present in illustrations and scanned photographs.

How Printers Mix Colors

BY NOW, YOU MIGHT HAVE THE IDEA that a color printer mixes pigments in the quantities needed for a given color and then applies that color to the page. Not

so. Instead, most printers overlay dots of whichever primary colors are needed—for example, to print a red dot, the printer overlays one yellow and one magenta dot. With this scheme, red, green, and blue dots are easy to create—the printer just applies equal amounts of two primaries. So, a color printer can easily produce eight colors: cyan, yellow, magenta, black, red, green, blue, and white. (To produce white, the printer applies no pigments at all—thus, its white is only as white as the paper you use.)

What about the rest of the spectrum? Ideally, a color printer could create other colors by applying pigments in unequal amounts—for example, a lot of magenta and just a tad of cyan. Some high-end color printers, such as the Kodak XL7700 and the Iris SmartJet Series 4012, can do just that, but the majority have just one dot size. To produce colors other than the eight just listed, these printers must resort to *dithering*.

Dithering involves applying cyan, yellow, magenta, and black dots in complex patterns that trick the eye into seeing other hues. But the eye isn't that easily fooled. Dithering results in impure colors, and it can give color output a speckled look—as if you'd sprinkled pepper on a bright paint to tone it down. What's more, the quality of the *dither patterns*—the arrangements of colored dots—can vary from one printer vendor to the next, as you can see in the output samples on page 145 of "Color Printer Progress."

If you're printing pie charts, text, and line drawings such as architectural diagrams, you can avoid dithering by using only the basic eight colors listed earlier. Otherwise, there's no escaping it—except to buy one of the few five-figure printers that can print continuous-tone images.

The Challenge of Photographs

NOTHING PUSHES THE ENVELOPE OF color printing like a scanned color photograph. A scan not only requires extensive dithering, it also requires *halftoning*—its continuous tones must be converted into a series of dots that a printer (or printing press) can produce.

In a halftone of a black-and-white photo, gray shades are simulated by dots of varying size—larger dots for darker grays, smaller dots for lighter ones. To create these dots, a printer combines the smallest dots it can create into clusters called *cells*, and then turns on varying numbers of dots within each cell.

Halftoning a color image is a similar, but trickier, process. First, the image must be separated into cyan, yellow, magenta, and black components; each resulting *screen* uses dots of varying size to represent

the amount of each primary color required to simulate the image's hues. Then, each screen is rotated to a different angle, causing all the dots to overlap and form sets of small circles called *rosettes*.

At the high resolutions used in professional printing, these rosettes are small enough to be invisible at normal reading distances. (You can see them if you try; look closely at any color photo in this magazine.) But at the 300-dpi resolution provided by most color printers, the rosettes are bigger than the blooms on Jack's beanstalk. You may not mind this chunky look if you're using a color printer to produce rough mock-ups. But if you're printing color output to check an image's color balance, the fat rosettes, plump halftone dots, and dither patterns will complicate your job by obscuring image details.

These drawbacks aren't present in the film recorder world or in the upper stratum of color printing, where printers such as the \$24,000 Kodak XL 7700 live. Costly dye-sublimation color printers can do jaw-dropping justice to color scans, thanks to these printers' translucent pigments. The \$39,000 Iris SmartJet 4012 color ink-jet printer also handles photos beautifully, because it can print variable-size dots.

From Screen to Paper: Matching Woes

IF YOU THINK THE MUDDY WATERS OF rosettes and screen angles are sloppy, put on your hip boots. One of the most complicated aspects of color output involves matching the colors you see on the screen with the colors a printer produces. This isn't critical for presentations and simple color-coding applications—who cares if a printed bar chart's hues differ from what you saw on the screen? But color matching is essential for color publishing. When publishers specify certain colors for a design or spend hours tweaking the color in scanned photographs, they want the final printed output to match what they saw on their screens. Publishers also need printers that can accurately reproduce colors in printing-industry color-specification systems such as Pantone and Trumatch.

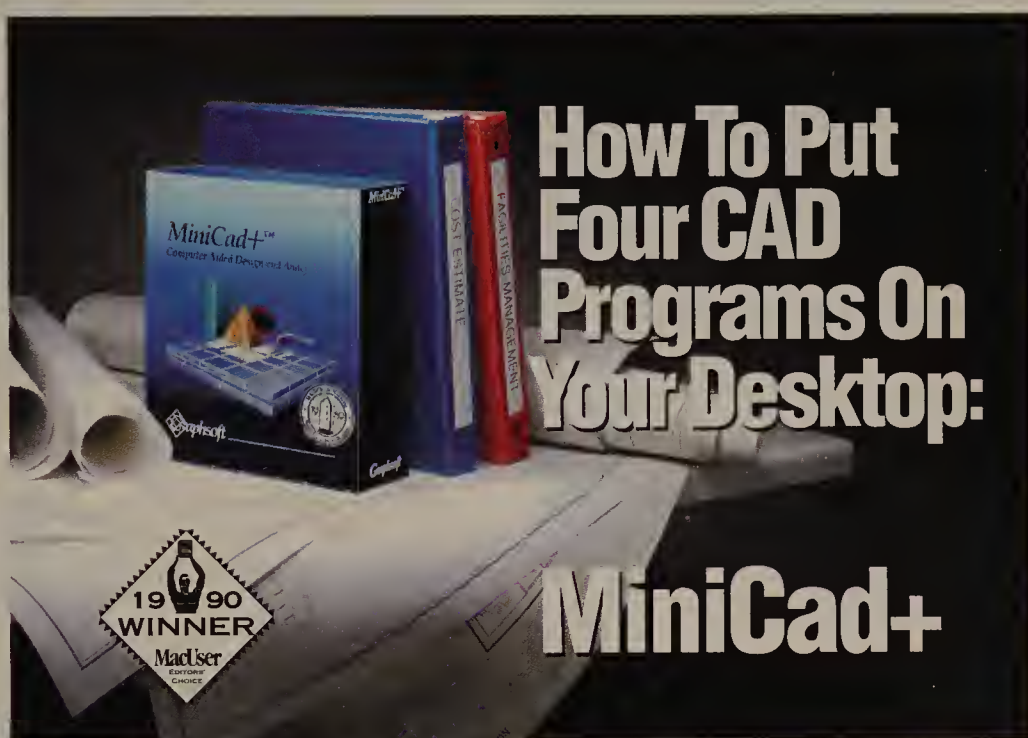
One problem behind screen-to-printer matching is that monitors and printers use different ingredients to mix their colors. Printers use cyan, yellow, magenta, and black pigments, while monitors use red, green, and blue light. Printing inks create colors by absorbing, or subtracting, light that would otherwise be reflected from paper; monitors create colors by adding light to a screen. In color jargon, printers use a *subtractive color model* (the CMYK model), while monitors use an *additive color model* (the RGB model). For more details on the different color-

producing systems, see "All about Color," *Macworld*, January 1992.

Because of this fundamental difference, documents you print must often go through a *transformation* process in which RGB colors are translated into their CMYK counterparts. But the phrase "something got lost in the translation" can apply to color transformations as readily as it does to language. Printers can't produce the same range of colors you see on the screen—technically speaking, they

have different *color gamuts*. So when you print an image, its RGB colors must be converted, or *mapped*, to the closest available CMYK colors. The result: the color that prints isn't what you saw on screen.

The paper used for printing is another variable in color matching. Paper isn't always completely white, and any tint alters colors by changing the way light is reflected. But this isn't a serious issue for most color printers, because most require *continues*



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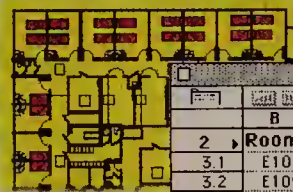
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a specific type of paper. (Where plain-paper output is concerned, color printer vendors are being pulled from two sides. Businesses want to be able to print charts and graphs on company stationery, but publishers need a pure white stock that provides consistent output.)

Other problems in color matching arise even before the output meets the printed page. An image displayed on your monitor is likely to look different on your coworkers' monitors—for that matter, it may look different on *your* monitor a month from now. One possible solution: *color-calibration* hardware such as Radius's PrecisionColor Calibrator or SuperMac's SuperMatch Display Calibrator. A calibrator uses an optical sensor that attaches to the front of a display. The sensor allows the Mac to compare the color a monitor is producing to the color the Mac's video signals are telling it to produce. If there are variations—and there probably will be—the calibrator's software can adjust the video signals to compensate, enabling the display to produce the colors it's supposed to.

But even with calibration hardware, accurate, consistent color isn't a given. You also need to take pains to ensure that room lighting is consistent and neutrally colored. Forget working in front of a wall of windows; for consistent results, you need the bunkerlike conditions often used by professional color separators: gray walls, no windows, and an even mixture of fluorescent and incandescent lighting.

For more details on the issues behind color matching, see "State of the Mac," *Macworld*, February 1991.

PostScript or QuickDraw?

ANOTHER POINT OF COMPARISON BETWEEN color printers is the type of commands a printer responds to. Midrange and high-end color printers use the PostScript page-description language, the same language used by most monochrome printers, including Apple's LaserWriter IIx and IIg. PostScript color printers are ideal for publishing applications and for printing images created with PostScript draw programs such as Adobe Illustrator and Aldus FreeHand. PostScript printers can also be shared across a network of Macs and IBM PCs.

Some color printers contain true Adobe Systems PostScript interpreters, but most are PostScript clones—they understand PostScript, but they don't use an Adobe interpreter to do so. As a result, they may deliver inferior text quality when printing Adobe Systems fonts. (For more background on PostScript-clone issues, see "High-Performance Printing," *Macworld*, December 1991.)

Low-end color printers, like their monochrome counterparts, don't speak PostScript, but instead use the Mac's native tongue, QuickDraw. With the growing popularity of Apple TrueType fonts and the Adobe Type Manager utility, QuickDraw printers can produce text that's comparable in quality to that of PostScript printers. But QuickDraw color printers still can't be used with IBM PCs, and QuickDraw color printers don't print images from programs such as Illustrator and FreeHand very well. You can work around the latter limitation by using *PostScript-emulation* software such as Custom Applications' Freedom of Press Professional, which resides on the Mac's hard drive and translates PostScript instructions into commands a non-PostScript printer can understand.

Ready for Prime Time?

COLOR PRINTER TECHNOLOGY HAS been a fast-moving target since the first printers appeared a few years ago. But in the evolutionary time line, today's printers still look a bit apelike. If you're a publishing professional, look closely at the current crop before you buy. The next year will bring models that handle continuous-tone images better. Also expect to see Apple build support for color matching into the Mac's system software.

Adobe's PostScript Level 2—found in Tektronix's Phaser III PXi color printer and Dataproducts' forthcoming Jolt PS—also promises to streamline color printing. PostScript Level 2 improves halftoning and has features designed to allow you to obtain consistent color from one printer to the next. But the Mac's current PostScript printer driver software doesn't support these features; until Apple releases its new driver later this year, PostScript Level 2's rosy promises are only that.

But if your color needs end with vivid pie charts or color-coded schematic diagrams, by all means consider taking the plunge. Today's affordable color printers may not be able to reproduce a photograph very well, but they sure make impressive business graphics. And film recorders such as GCC Technologies' ColorFast deliver stunning results with charts and photographs alike. But until continuous-tone printers become more affordable, the best business for color printers is business. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are *Macworld Complete Mac Handbook* (IDG Books Worldwide, 1991) and *Macworld Guide to Microsoft Word 5* (1992), both published by IDG Books.

Images & Tools is a two-day event sponsored by *Macworld* magazine. You will learn

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Ron Chan, formerly with the *San Francisco Chronicle*, illustrates for advertising agencies, design firms, and magazines. Arne Hurty, senior designer/informational graphics at *Macworld*, was the winner of the first Aldus FreeHand

illustration contest, published in *Print* magazine. John Hersey is an illustrator whose work has appeared in *Esquire*, *GQ*, *LA Style*, and the *Washington Post*.

Erik Adigard, who studied fine arts in France, came to computer illustration through his experience in video animation. Sanjay Sakhuja is president of Digital

Pre-Press International, a PostScript-based, state-of-the-art color-separation house. John Knoll, one of the creators of Adobe Photoshop, currently works for

Industrial Light & Magic.

Conference registration is \$495 and includes all sessions, conference materials, breaks, and luncheons. Checks must be made payable to Macworld Communications and sent to: Sandy Butler, Events Manager, Macworld Communications, 501 Second St., Suite 500, San Francisco, CA 94107.

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Tap your keyboard's power with macros

Macro programs allow you to get your work done faster by automating a series of commands so they can be accomplished with a single keystroke. CE Software's QuickKeys, first released in 1987, quickly became the most popular macro program for the Mac. QuickKeys² followed in late 1990, and the update added features long awaited by macro fiends, such as plug-in extendability and a new macro recorder. If you're a longtime QuickKeys user and are considering the step up to System 7, be aware that you'll need to use QuickKeys² version 2.1 or later for System 7 compatibility.

For the tips that follow, thanks go to CE Software's Sue Nail and the company's technical-support department, and to QuickKeys² power users

Frank Kofsky, Gordon Miller, Moe Rubenzahl, Gary Boone, and Bruce Bicknell.

Refuse Help

If you're like most people, when using an extended keyboard, you often go to press the backspace (delete) key, only to hit the adjacent help key instead. So you drum your fingers while the current application's help system comes up on screen. Then you click on Cancel, wait for help to go away, and finally get back to work. To avoid the problem, create an Alias QuickKey that invokes the delete key when you press help. Then set ⌘-help to bring up help. Note that this is a real lurking time bomb for anyone else using the computer, especially novices.

Here's another idea for the help key. On an extended keyboard, remap the help key (using an Alias QuickKey) to Open, or ⌘-O, and the del key (under the help key) to the "close window" Mousie, a sequence that closes the active window. You shouldn't miss these two keys in any programs, but they are easily my most used keys with the new functions defined. And the del key even bears a symbol that looks a little like a close box, so it's easy to remember.

General Tip

It's easy to create QuickKeys and then forget what keystroke you picked to invoke a macro. To avoid this, use a consistent method of assigning QuickKeys. For example, use

⌘-shift-S for Save As in all of your applications.

Getting Around the Finder

To open a file or application, don't use Click QuickKeys to open folders and then manually double-click on the item. Use a File QuickKey to do the job faster and more reliably.

Here's a tip for navigating. Define Menu/DA QuickKeys for the applications you use most frequently, so that you can select any of these applications, when they're open, from System 7's application menu (on the far right end of the menu bar). The menu choices will be grayed out, but QuickKeys will still recognize your choices. I use a ⌘-control combination to define these keys: for example, ⌘-control-spacebar to switch to the Finder; ⌘-control-M to select Microsoft Word; ⌘-control-N to select Navigator. One more thing: when defining keys for selecting applications, check the box that keeps the option key held down. That way, the application you're working in hides its windows as the application you've selected opens.

Automating Applications

One of the advantages of having each desk accessory behave as an application under System 7 is that a DA can have a special

Use Aliases for Uniformity and Convenience

The Alias function in QuickKeys² is one of the program's most powerful features; it lets you remap the keyboard, or assign one keystroke to another. This has nothing to do with System 7's alias feature, so don't be perplexed by the similar terminology.

Many people use a variety of programs to accomplish their jobs, and often those programs have similar functions but different keyboard shortcuts. To keep from having to remember the shortcuts from every different program, consolidate them with an alias. For in-

stance, although UltraPaint, FreeHand, and MacDraw each use a different keyboard shortcut to invoke the Align Objects command, you can assign the same alias—say ⌘-backslash (\)—to execute the command in those and other programs.

Aliases can give you something better than smart quotes. Redefine the little-used bracket keys ([and]) to be left and right curly quotes (" and "), and the apostrophe key to give you a curly apostrophe ('). You can also redefine shift-period and shift-

comma to give you the period and the comma, instead of the greater than (>) and less than (<) symbols. In all cases, set up the keys so that pressing option-key gives you the old key (for instance, pressing option-[gives you the [character).

QuarkXPress and FreeHand require a p for pica measurements (for example, 1p7 denotes one pica and seven points). In these programs, use an Alias QuickKey to set the equal sign on the numeric keypad to type a p—you can use one hand to enter values.

cific set of QuickKeys for itself (whereas in System 6.X, only the DA Handler can have such a set). This gives you the full range of QuickKeys' power in your DAs.

Sometimes you want a macro to run automatically after you launch an application. To do this, create a File QuickKey, then use the Timer Options button to specify how many seconds the Mac should wait after the application starts, before running the QuickKey. Specifying zero fires off the macro immediately after the program is launched.

Extensions in Action

An especially useful feature of QuickKeys² is the ability to use extensions, which are plug-in bits of code that add new functions to the program. CE Software provides several extensions with the package, and others are available from electronic services such as America Online and CompuServe. Many people don't seem to know about extensions, or don't use them, so here are some tips to get you started.

Switch between the different laser printers in your office with the Choosy extension. You'll be able to assign different keystrokes to each printer and choose one by typing a key combination.

Use the Location extension to set the default standard file folder for the various applications you use. This is especially handy if you keep all your applications in one folder and data for those programs in other folders. To automate this even more, when you're in the application for which you have set the Location macro, create a sequence that uses the Timer Options button to run immediately after launch, then include the Location macro in that sequence. For example, I have different folders for my letters, spreadsheets, and database files. When I launch Excel, the start-up sequence automatically runs the Location Extension for Excel, so that when I save a new spreadsheet, the standard file dialog is al-

ready set with my Spreadsheets folder as the default.

For PowerBook users, use QuickKeys with AppleTalk Remote Access to dial in to your office network. While you're connected, create a macro, using the Mounity extension, to connect you to a file server or System 7 shared disk on your office's network. Then when you're on the road, type your macro, and the PowerBook will connect you to the server.

Conditional Branching

Simeon Leifer's extensions give QuickKeys conditional (IF-THEN) branching, which CE Software left out. They go by names like WindowDecision, MenuDecision, MenuWait, CursorWait, and WindowWait, and they're pay-what-you-think-it's-worth-ware. You can get them from online services, bulletin boards, and direct from Leifer by sending a disk and a self-addressed, stamped envelope (or your address and \$5) to 1134 Oak St., South Pasadena, CA 91030.

Here's one example using such an extension: In Microsoft Word, it would be more convenient for ⌘-return to click on the Change All button when the Change dialog box is showing instead of changing one word at a time. In addition, it should perform its normal insert-a-new-paragraph function when you're in a document window. Well, here's how you do it: create a Sequence QuickKey that starts with Leifer's WindowDecision QuickKey (see "WindowDecision"). That QuickKey checks to see if the front window is named Change. If it's not, the QuickKey simply types ⌘-return. If the front window is named Change, the sequence branches to another QuickKey named Change All—a button QuickKey that clicks on the Change All button.

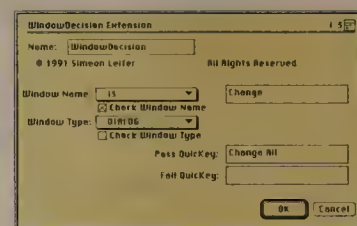
Power Sequence Tips

QuickKeys² introduced the macro recorder, which records your actions and converts them into a sequence macro.

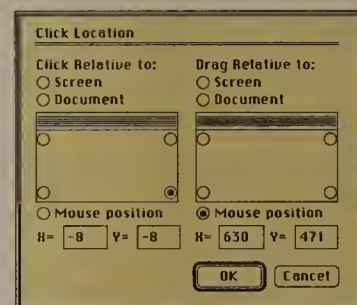
The recorder is fine for a short sequence of actions, but it gets unwieldy when you try to record a long series of actions. In a complicated sequence, don't record the sequence; break it into separate steps (each one a QuickKey) and then create a sequence that plays all the steps. If the sequence macro doesn't work properly, it's much easier to troubleshoot in a step-by-step fashion.

QuickKeys can't do everything. Often you will want to stop in the middle of a sequence, perform some actions, then continue with the sequence. The solution is to insert a pause QuickKey line in the macro, and enable the Pause and Wait for User option. You can perform most actions while a sequence is paused, then restart the sequence from the QuickKeys menu in the Apple menu. The real power tip, though, is to assign the F15 key (which has *pause* written on it) to invoke QuickKeys' Pause command. Then anytime a sequence is paused, you simply press F15 to restart it. This makes for fast, powerful sequences that allow for intelligent input.

At first glance it seems that there's no way to simply exit in the middle of a looping sequence in QuickKeys (aside from clicking the mouse at exactly the right time). The solution is to insert one of Leifer's extensions (like WindowDecision or MenuDecision) that will detect a predefined condition in a document or application when the sequence ends. (For example, the extension can check to see if the active window has a certain name or is a specific type, say, a dialog box or a system window.) This decision step will return a Message QuickKey if the defined condition is true, and you choose the Show Cancel Button option when defining the sequence. The sequence then pops up a dialog box with your choice of message. Click on the Cancel button to exit the sequence. This isn't as good as the sequence simply stopping on its own, but it does work.



WindowDecision This segment of a Sequence QuickKey checks the name of the front window and performs different actions depending on whether the window is named Change.



Full Windows This setup for a Click QuickKey expands the current window to full-screen size on a standard Apple 13-inch RGB display. You can adjust the two numbers on the right for other displays.

Going Around and Around

If you're running System 7, this is how to make QuickKeys loop (that is, have a macro repeat a sequence over and over). The Repeat extension is fine, if you know exactly how many times you want the macro to repeat, and the timer in Timer Options is fine if you don't mind figuring out exactly how long your sequence takes to run and then wasting a few seconds between each iteration. But sometimes you want the sequence to just run over and over until the end of the document is reached. I typically use loops when I am formatting a database and want the first line of a record to be in one style, the second line in another, and so on, for each record in the database. Search-and-replace just doesn't cut it for this task.

By intentional design, QuickKeys will not loop a sequence where the last line is an alias that executes the key combination defined to execute the same sequence. You can work around this by taking advantage of CEIAC, the

miniapplication that CE Software provides to transport Apple events between QuickKeys and applications.

Define a sequence and save it with a name, and then add an Apple Events QuickKey as the last line of the sequence. In the Apple Events Extension window, opt to send an event to CEIAC, and choose a Look Up From Target event. When the events window appears, choose the QuickKeys suite of events, then when the events appear, choose Play by Name from the list. Press return, then double-click on the event that now appears in a list box. Type the name of your macro in the text entry box and press return. Set the Return Value in the Apple Events Extension window to Ignore and OK your way back to the Sequence window. Now your sequence reexecutes itself by sending an event to QuickKeys, which plays the sequence.

In an application like Word, if your sequence involves a Find command, the loop will automatically interrupt at the end, when Word asks you "Continue search from beginning of document?"

When experimenting with a sequence, if you notice the macro making complete hash of your document, you can also interrupt the sequence by clicking the mouse a few times (try to remember to save your document before running a macro like this).

QuickKeys Apple events bug warning: Hide the application you are defining the event for and do all your editing with the Finder as the active application; otherwise, the application will sometimes hang after you select the event from the suite.

Energize the Template for a Surprise

This tip isn't terribly useful, but it's fun. Launch the Template Printer application and choose About Template Printer from the Apple menu. Then don't use your keyboard or your mouse for 30 seconds, and you will get a surprise. For

more fun, press ⌘-option-shift-spacebar after you have waited for 30 seconds.

Full Windows

QuickKeys has a window-size adjustment tool built in: Zoom Window. This Mousie mimics the action of clicking in the Zoom box. But often you want your window to expand to fill the screen. Zoom Window won't necessarily do that, but with a little effort you can make a Click QuickKey that will do the job.

In the Click Location dialog box (you get to this dialog box by clicking the button marked Click in the Click QuickKey's main window), make the click relative to the bottom-right corner of the screen with the coordinate values of X=-8 and Y=-8. Then set the drag relative to the screen with the x, y coordinates set for the bottom-right corner of your screen (mine measures X=630, Y=471) (see "Full Windows").

Tips in Print

There's a new source for more tips and tricks with QuickKeys. It's *The Little QuickKeys Book* (Peachpit Press, 1992) by Don Sellers and *Macworld* contributing editor Steve Roth. The book covers every QuickKey type, explores keyset strategies, and contains bunches of application-specific tips. Thanks to Don and Steve for sharing some of their tips here.

Sharing the Wealth

If you've found a tip or a shortcut that wasn't mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second Street, San Francisco, CA 94107. **m**

See *Where to Buy* for contact information.

TOM NEGRINO is a *Macworld* contributing editor and a director of the Los Angeles Macintosh Group. He is a contributor to the *Macworld Read Me First Book* (IDG Books Worldwide, 1991).

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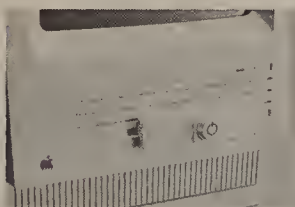
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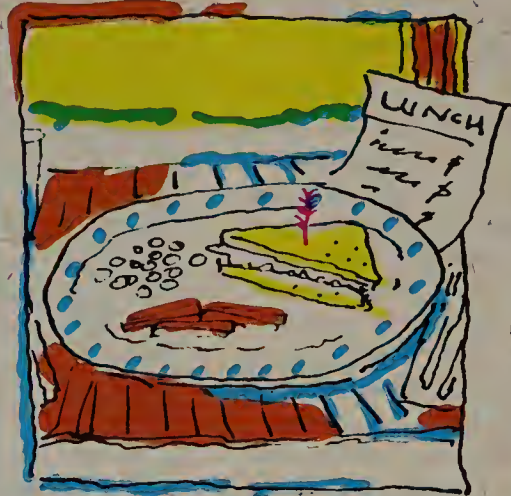
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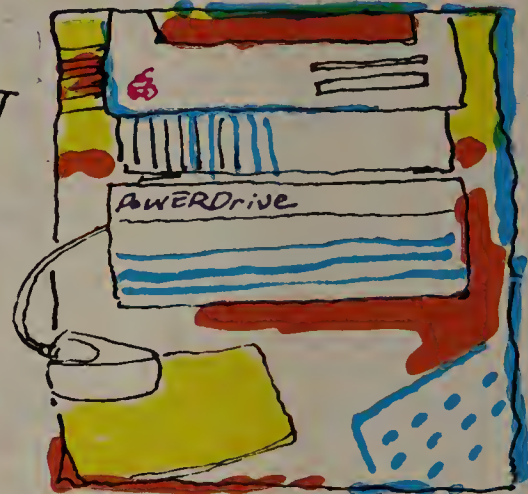
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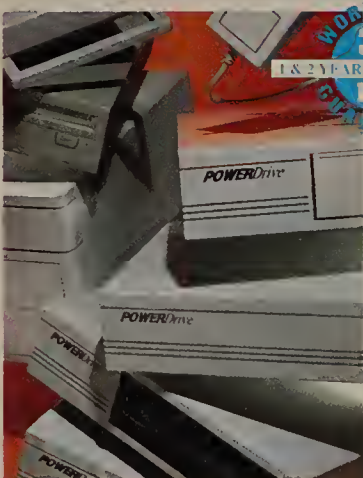
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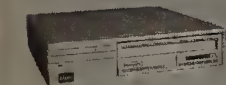
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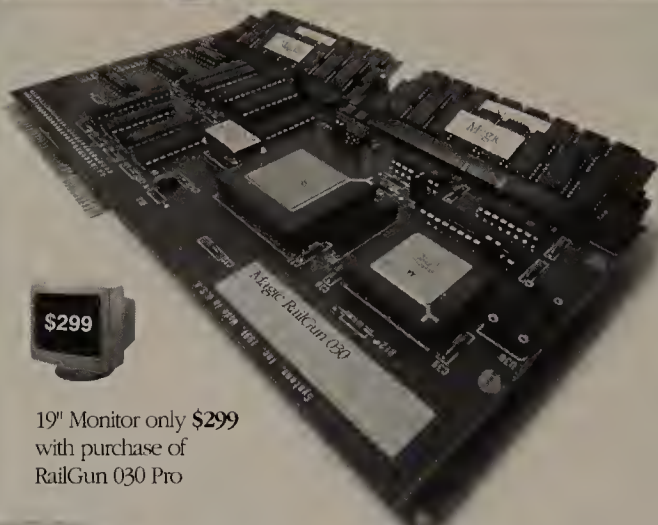
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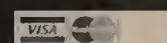
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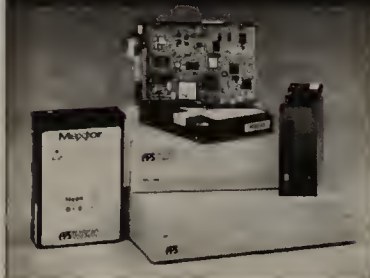
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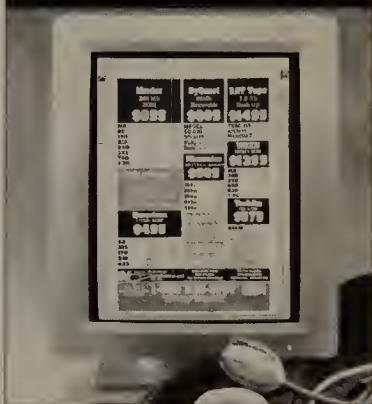
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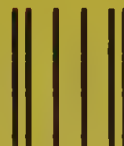
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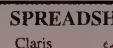
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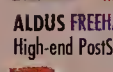
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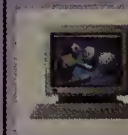
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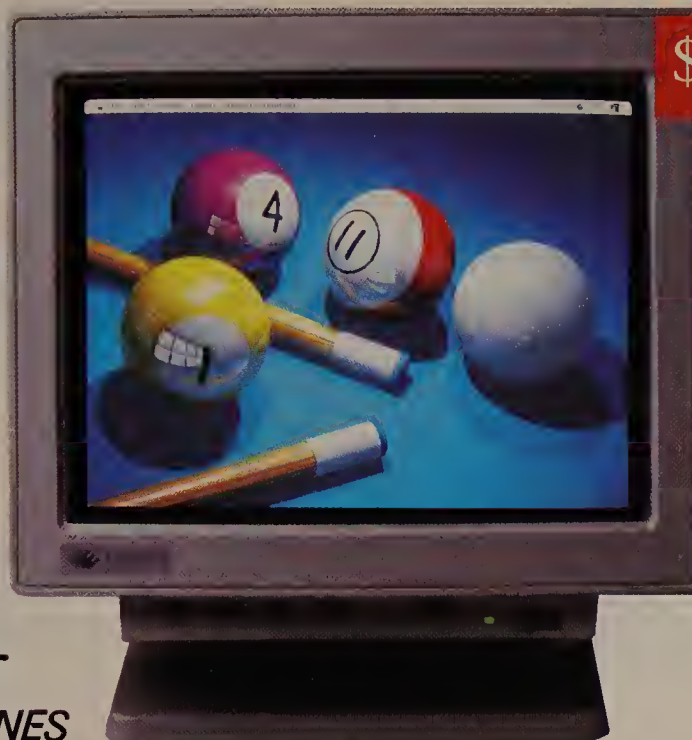
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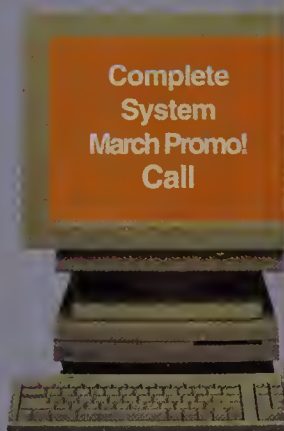
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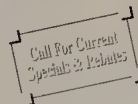
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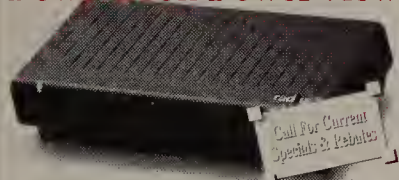


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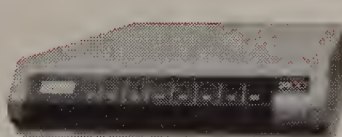
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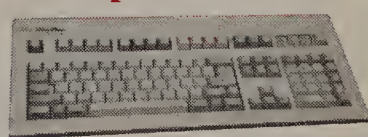
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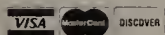
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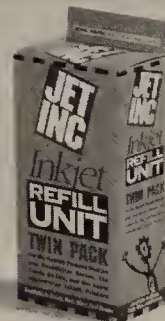


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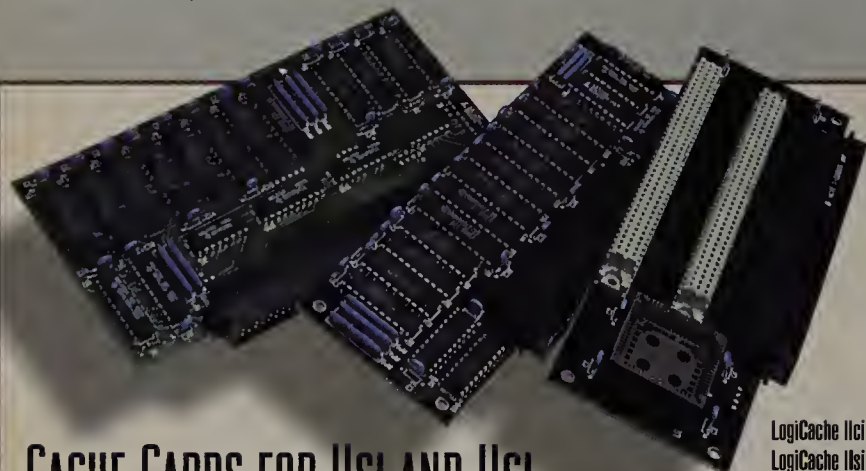
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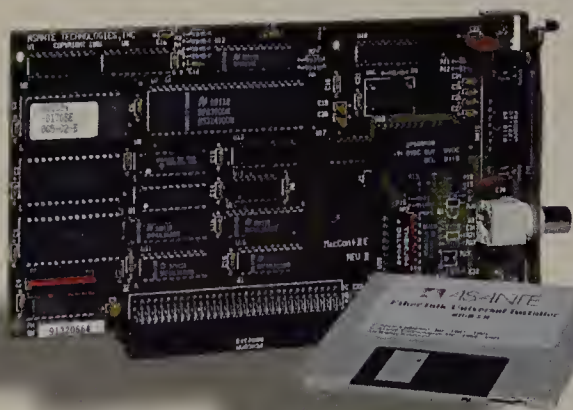
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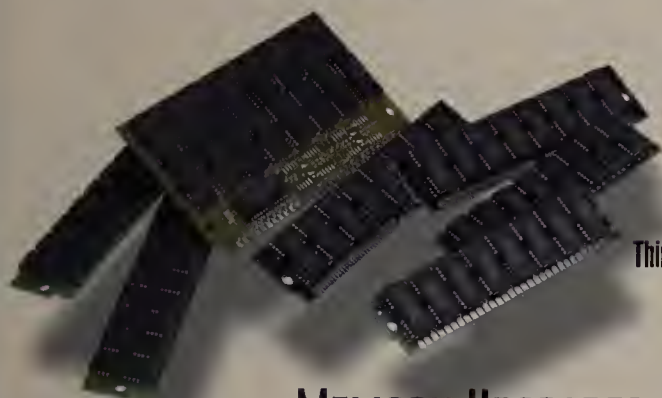
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- VisionPro Ikegami System
 - 8-bit SP 20" Trinitron\$2497
 - 24-bit SP 20" Trinitron
 - Editors' Choice, MacWorld 1/92\$3349
 - VisionPro Sony System (Multiscan)
 - 8-bit SPS 20" Sony Trinitron (GDM 1936)\$3297
 - 24-bit SPS 20" Sony Trinitron (GDM 1936)\$3797
- All VisionPro systems come with tilt/swivel monitors, in 110v or 220v.

MONITORS

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- Seiko 1445 14" Trinitron\$629
- Sony 16" Trinitron\$1297
- Ikegami 20" CT20 Trinitron\$1897
- Sony 20" GDM 1936 Trinitron\$2497



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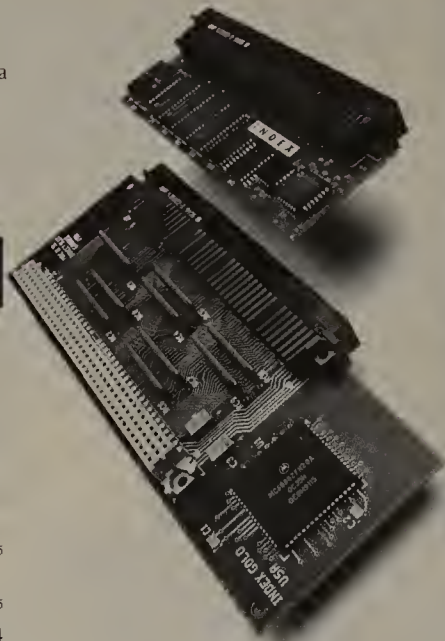
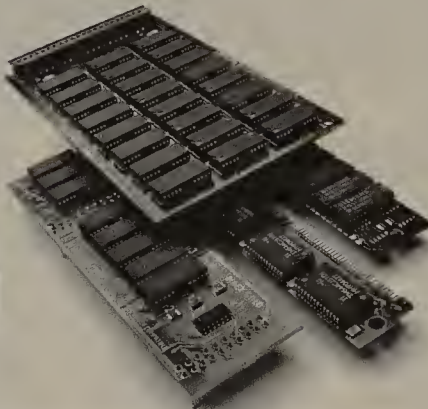


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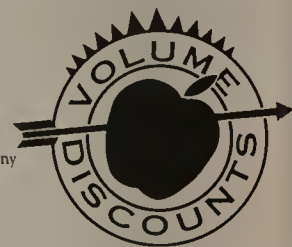
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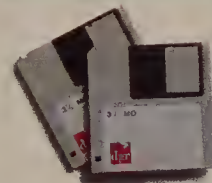


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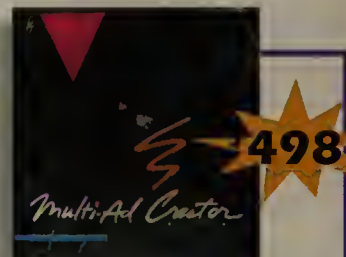
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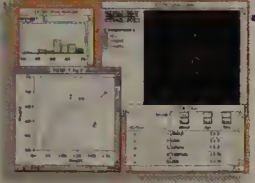
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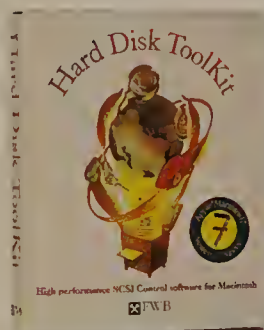
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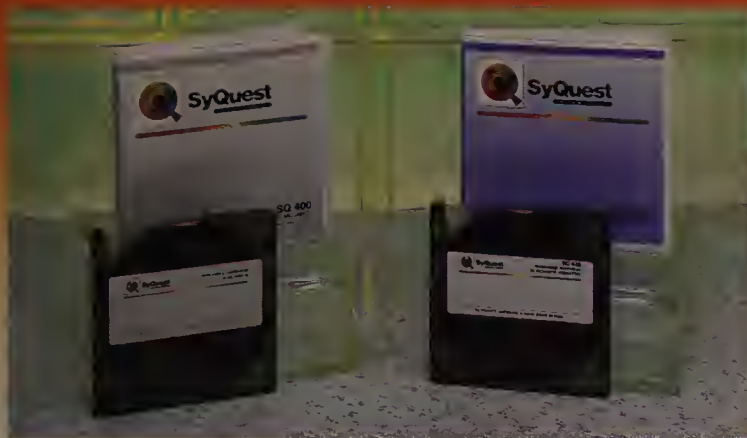
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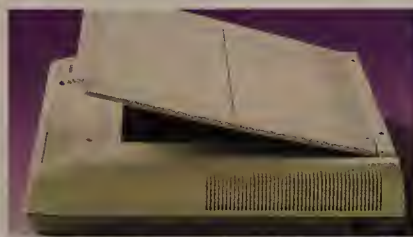
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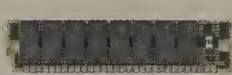
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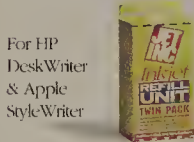
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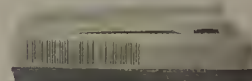
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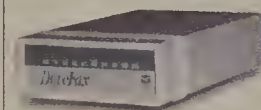
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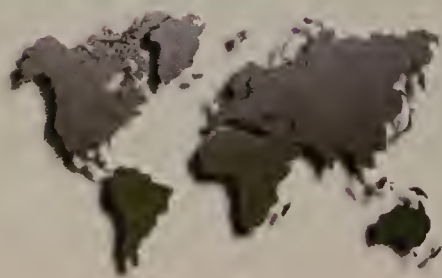
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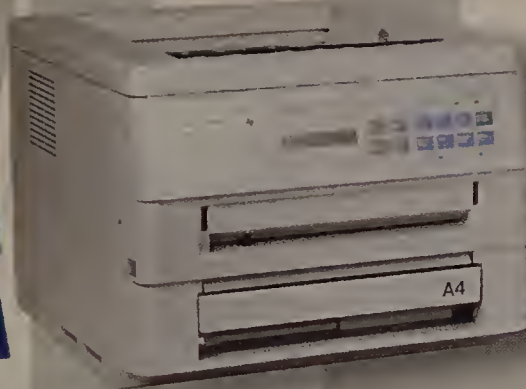
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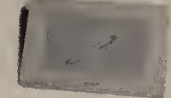
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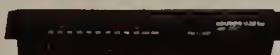
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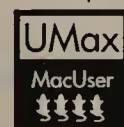
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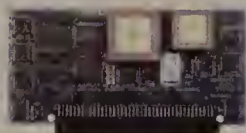
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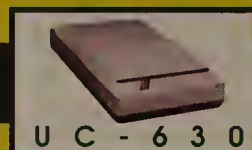


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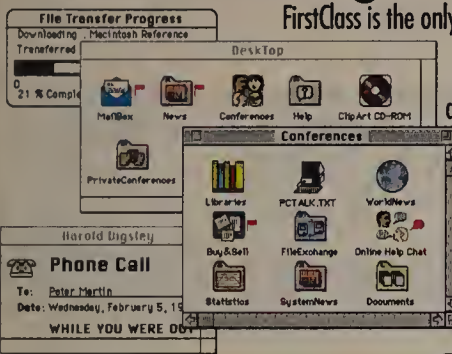
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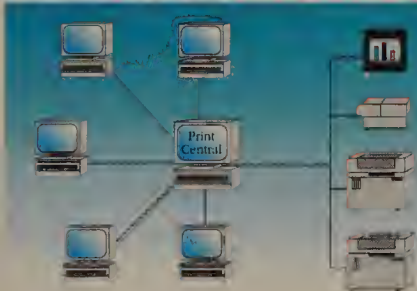
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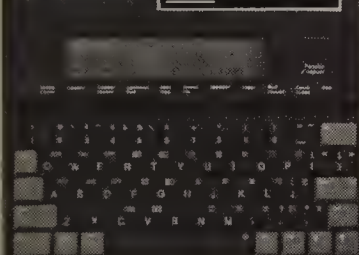
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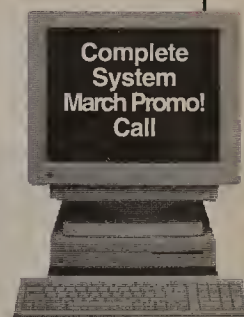
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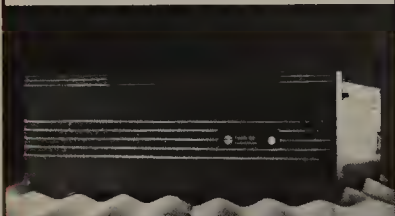
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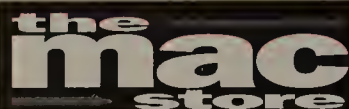
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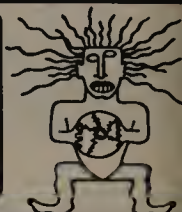
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
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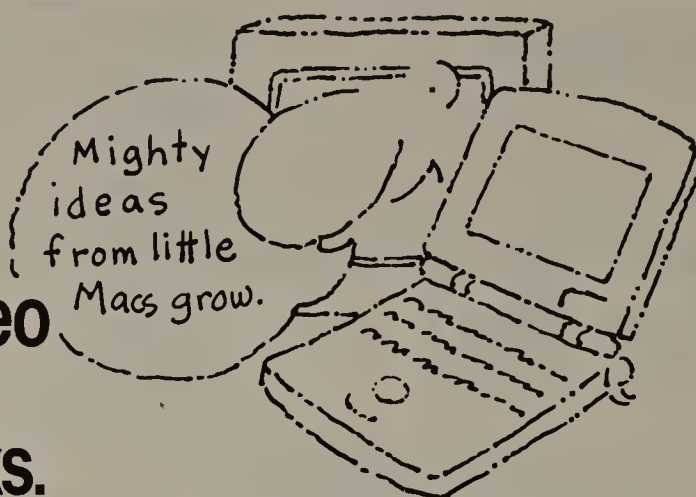
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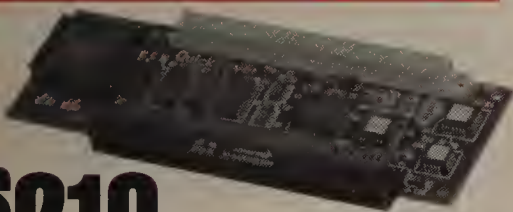
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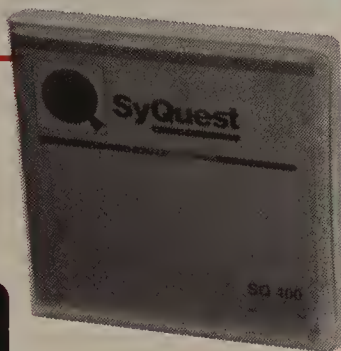
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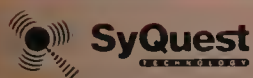
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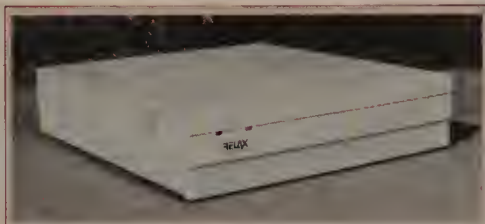
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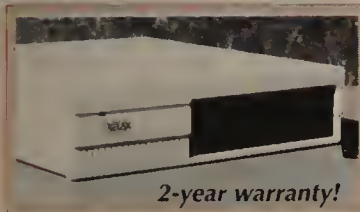
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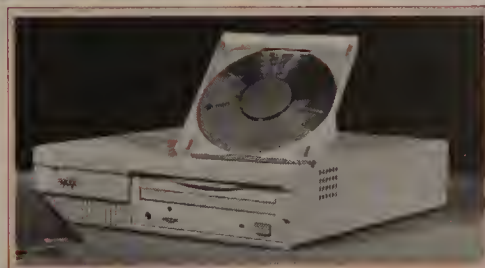


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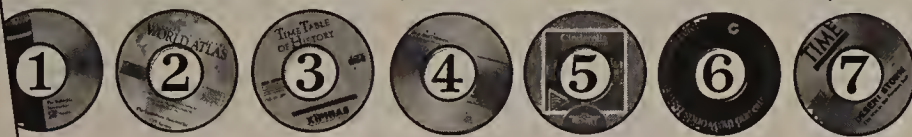


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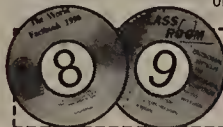
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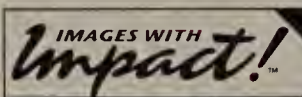
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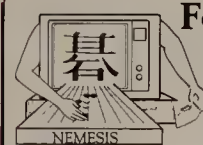
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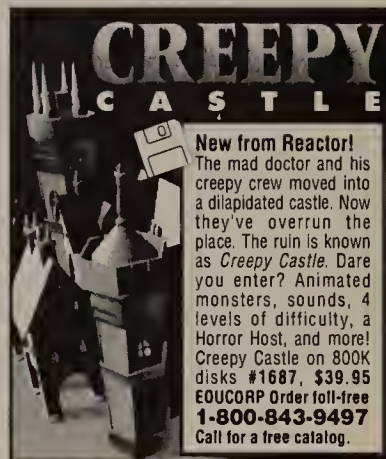
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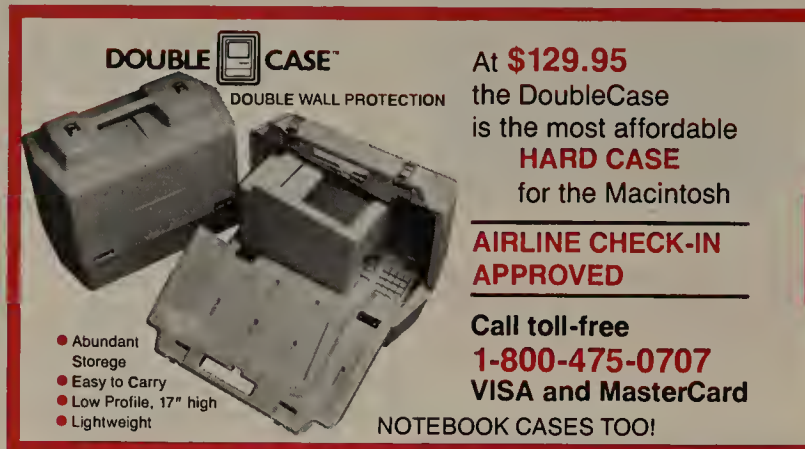
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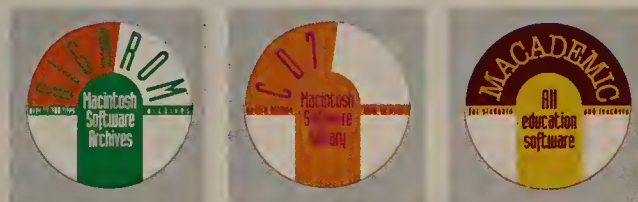
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Mac IIfx - 5/105 (Quantum)	3099
Mac IIfx - 3/40	1999
Mac IIfx - 5/80	2549
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Mac Quadra 700 - 4 meg	4500
Mac Quadra 700 - 4/80	5050
Mac Quadra 700 - 4/160	5515
Mac Quadra 900 - 4 meg	5675
Mac Quadra 900 - 4/160	6695
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Radius	
19" Precision Color Display	2290
21" Color Display	3125
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Color Pivot Interface	515
II, LC, IIfx, SE, SE/30	
Full Page System for Classic	825
Full Page System for LC	885
Full Page System for SE	825
Pivot Display for Built-in Video	799
Two Page Display 19"	959
Two Page Display 21"	1230

MONITORS (cont.)

	Price
Two Page Display Interface	399
SE, SE/30, II, IIfx	
Precision 8 interface	515
Precision 24x	1700
Precision 8x	799
Rocket Accelerator	1700
Apple	
Apple 13" Highres	649
Seiko	
Seiko CM-1445	569
SuperMac	
Platinum 19" Display	964
Platinum Two-Page Display	1239
Super Match 19" Color	1929
Super Match 21"	
Two-Page Color Display	3031
Dual-Mode Trinitron 19"	2699
Thunder/8	1159
Thunder/24	2899
Spectrum 8.24 PDQ	899
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14" Color Monitor	499

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Quantum 105 Pro	469	369
Quantum 210 Pro	835	710
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Maxtor 340		1099
Maxtor 180 meg	1800	
Syquest 44MB	519	
Syquest 88MB	879	
Internal Drive Kit		29
Syquest 44MB cart.		75

SOFTWARE

Microsoft Word	269
Microsoft Excell	309
Aldus Pagemaker	497
Caere Omnipage	499

SOFTWARE (cont.)

Adobe Photoshop 2.0	515
Quark Express	529
Adobe Streamline	69

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NEC PS 40	4795

SCANNERS

Logitech ScanMan 32	279
Microtek 600ZS w/Photoshop	1299
Microtek 1850S Slide	1895
Scanner	
Caere Typist	420

MODEMS

Zoom	
FX9624 Plus 2400 BPS	139
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9600 BPS	105
v.32 Turbo w/v.42bis	
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Profile

D I V E R S I T Y I N M U S I C

A FEW YEARS AGO, POP MUSICIAN Thomas Dolby discovered the Mac was becoming "a fabulous tool for making music." Dolby's well qualified to say so: his upcoming album, *Astronauts and Heretics*, is one of the first albums with major distribution to be completely engineered using a Macintosh.

At his home, Dolby reconstructed studio sessions from musicians around the world using a Mac IIx with a 640MB hard drive, Digidesign's Pro Tools, and Studio Vision 1.3, a MIDI sequencing program from Opcode. He then sequenced the sessions with his own instruments and layered on other elements using Studio Vision.

"When I worked with the musicians, I just let them jam," Dolby said. "Later I chopped up the performances and moved them around without losing the live element." He added his keyboard work and vocals to music from players you'd never expect to see in the same studio: Cajun violinists, a punk rock drummer, a heavy metal guitarist, an Israeli singer, and guitar players from the Grateful Dead, as well as a cast of frogs and many others.

Dolby says that if you tried to duplicate his work with a Mac in a studio, "you'd be spending so much money that you'd be in a constant state of terror." Notably, Dolby financed the production of the album, due this spring, mostly by himself.

Many professional musicians still rely on a studio engineer to mix songs for them, but Dolby hopes to change all that. Last year he gave lectures on music and the Mac at various colleges around the United States and taught a workshop at the Keyboard Institute of Technology in Los Angeles. This year, he's starting a school where professional musicians can learn Macintosh MIDI applications in a weekend or an evening.

—CAROLYN BICKFORD

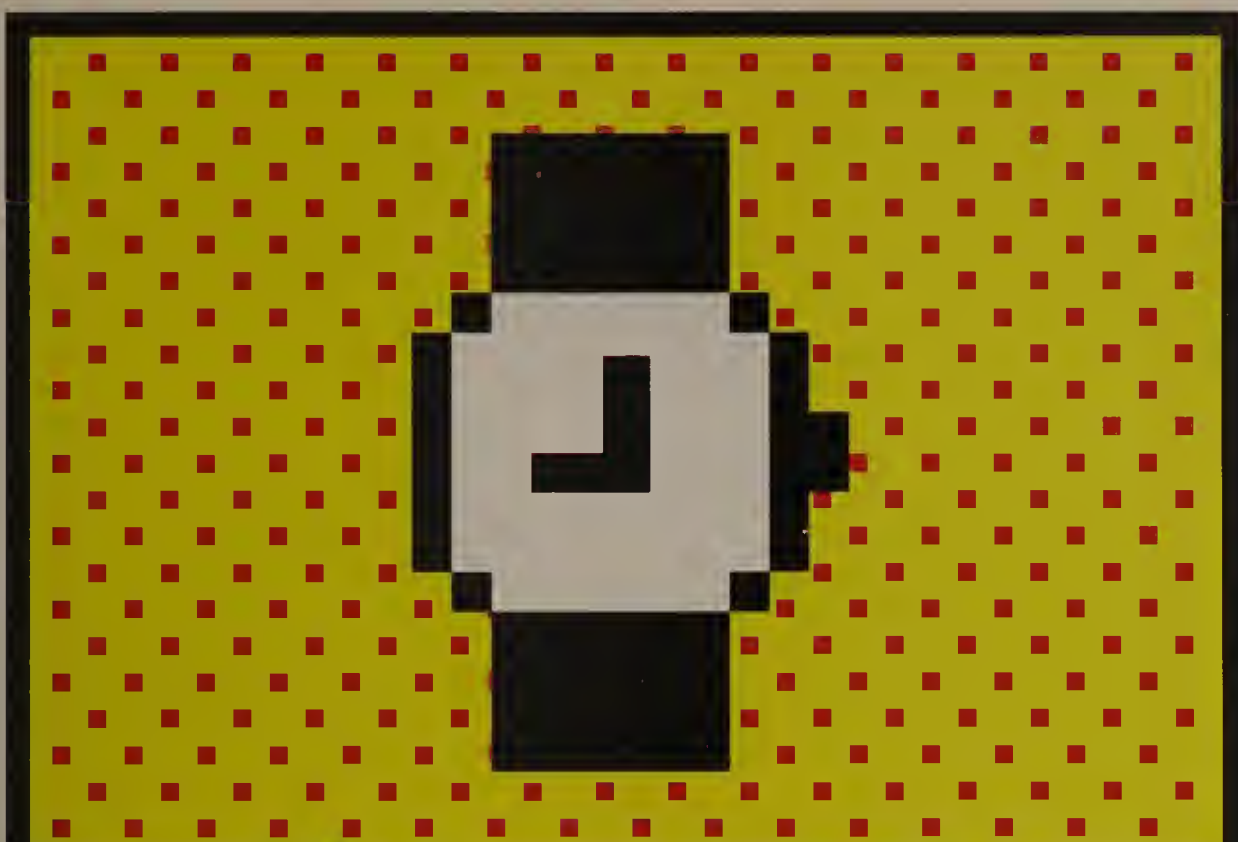


JEFFREY S. HALL

Thomas Dolby

MUSICIAN

LOS ANGELES, CALIFORNIA



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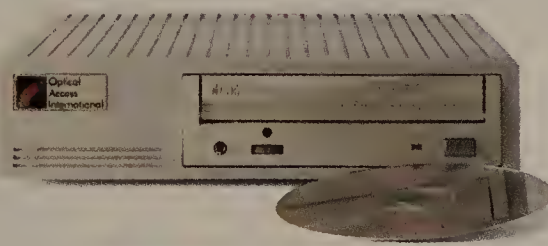
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Best-Sellers

APRIL 1992

Months on chart
▼
Last month
▼
This month
▼

Business Software

74	2	1	Microsoft Excel <i>Microsoft Corporation</i>
83	1	2	Microsoft Word <i>Microsoft Corporation</i>
5	3	3	Microsoft Office <i>Microsoft Corporation</i>
61	4	4	Microsoft Works <i>Microsoft Corporation</i>
35	12	5	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
21	8	6	Quicken <i>Intuit</i>
3	6	7	Calendar Creator <i>Power Up Software Corporation</i>
59	5	8	MacWrite II <i>Claris Corporation</i>
4	7	9	Aldus Persuasion <i>Aldus Corporation</i>
4	11	10	MacDraw Pro <i>Claris Corporation</i>
17	10	11	MacProject <i>Claris Corporation</i>
5	14	12	Microsoft PowerPoint <i>Microsoft Corporation</i>
70	9	13	Aldus PageMaker <i>Aldus Corporation</i>
35	13	14	FileMaker Pro <i>Claris Corporation</i>
59	15	15	MacDraw II <i>Claris Corporation</i>

Education Software

36	2	1	Where in the World Is Carmen Sandiego? <i>Broderbund Software</i>
50	1	2	Reader Rabbit <i>The Learning Company</i>
17	3	3	Where in Time Is Carmen Sandiego? <i>Broderbund Software</i>
22	4	4	Where in the USA Is Carmen Sandiego? <i>Broderbund Software</i>
61	5	5	Math Blaster <i>Davidson & Associates</i>

Months on chart
▼
Last month
▼
This month
▼

Entertainment Software

48	1	1	Microsoft Flight Simulator <i>Microsoft Corporation</i>
27	3	2	SimCity <i>Maxis</i>
13	2	3	SimEarth <i>Maxis</i>
23	—	4	Tetris <i>Spectrum HoloByte</i>
2	5	5	Chessmaster 2000 <i>Electronic Arts</i>

Network/Data Communications

29	—	1	PhoneNet <i>Farallon Computing</i>
15	1	2	MacLink Plus <i>DataViz</i>
62	4	3	TOPS <i>Sitka Corporation</i>
16	2	4	White Knight <i>FreeSoft</i>
17	3	5	Timbuktu <i>Farallon Computing</i>

Add-In Boards

12	1	1	Macintosh IIsi NuBus Adapter Card <i>Apple Computer</i>
3	3	2	MacCon+ 30i Ethernet Card <i>Asanté Technologies</i>
16	5	3	Macintosh Display Card 8•24 <i>Apple Computer</i>
3	2	4	Macintosh IIfx Logic Board Upgrade <i>Apple Computer</i>
3	4	5	Macintosh ILCi Cache Card <i>Apple Computer</i>

Months on chart
▼
Last month
▼
This month
▼

Utility Software

11	1	1	After Dark <i>Berkeley Systems</i>
18	2	2	The Norton Utilities for the Macintosh <i>Symantec Corporation</i>
4	3	3	Suitcase II <i>Fifth Generation Systems</i>
12	5	4	Virex <i>Microcom</i>
22	—	5	SAM <i>Symantec Corporation</i>

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$500	-50
Mac Plus/2MB/20MB	\$750	-100
Mac SE/2MB/20MB	\$850	-150
Mac Portable/1MB/40MB	\$1300	-200
Mac Classic/2MB/40MB	\$800	-200
Mac SE/30/2MB/40MB	\$1700	-300
Mac LC/2MB/40MB	\$1100	-300
Mac II/4MB/40MB	\$1700	-250
Mac IICx/4MB/80MB	\$2100	-700
Mac ILCi/4MB/80MB	\$2800	-400
Mac IIfx/4MB/80MB	\$4200	-100
Apple 12-inch B&W display/board	\$325	0
Apple 13-inch RGB display/board	\$625	-75
LaserWriter Plus	\$1200	-50
LaserWriter IINT	\$1850	-50

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during the week of February 6. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during December 1991.

"Don Says Mirror's New Monochrome Displays Are Clearly Their Best Product..."

Don Rittner, President of
M.E.C.C.A. User Group
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\$449 for built in video
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19" \$799 with card.

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...But What Do

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"Unarguably the best products in the Mirror line."

— Don Rittner

Don Rittner, president of M.E.C.C.A., thinks that monochrome monitors are Mirror's best products. But members of his own users' group disagree.

It's possible that Don may be right. After all, we've just introduced a new 21" two-page and a 15" full-page display. Use them with a built-in video port on some Macs or with a Mirror monochrome video card for a sharp, bright view of your work.

Stephen C. Frantz, Ph.D., member

The 19" two-page display comes with a monochrome video card for the SE, Classic, LC, SE/30, Mac II or Quadra.

All three systems feature high-contrast, razor-sharp images, reduced VLF and ELF emissions, and built in ADB ports for reduced cable clutter.

Stephen Frantz prefers Mirror's color monitors because there's one for every need and budget. Like the 14" for example.



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20" ProView, 24-bit	\$2999
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20" ProView V, 24-bit	\$2399

†Please call for other options.
*for built in video ports

"Mirror's 14" color is under 400 bucks, and it looks great."

— Stephen C. Frantz

It gives you large screen color for a monochrome price, 640 X 480 resolution for 56% more work-space than Apple's 12" monitor, and brilliant color from

Hilary Koppel, member

the built-in video port of your LC IIsi, Ilci or Quadra.

"Mirror's done it again. This is a real breakthrough, a 16" Trinitron for \$1299."

— Hilary Koppel

Stephen is not the only one excited about Mirror color systems. Hilary loves the new 16" Trinitron. Designed for the pro who demands the highest quality, but can't justify the high cost, the Mirror 16" Display has 832 X 624 resolution for comfortable viewing of two-page layouts or large spreadsheets.

Use Mirror's 16" Trinitron with the built-in video port on IIsi, Ilci or Quadra, or our optional video card for any Mac I

If you need a no compromise two-page color display, Michael advises checking out the Mirror ProView.

Available in 8-bit or 24-bit models, the ProView is "a real bargain" according to the May '91

Michael Levy, member



es He Know?"

Members of
Macintosh Enthusiasts Club
of the Capital Area

issue of MacUser magazine.
Whether you choose the original
ProView Trinitron model or the
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get more than you pay for.

**"The ProView can
handle my most demand-
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ease; and best of all, I
can afford it."**

— Michael Levy

The Mirror Color Scanner,
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24-bit scanning for only \$1299
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2.0. It has more features and
higher quality than competing
models, yet is priced far less.

**"This would be
a good scanner
for \$2000; for
\$1299 it's
unbelievable."**

— Nancy M. Benz

In December 1991
MacUser gave this scanner 4

Nancy M. Benz, member

mice, saying, "the quality of the
hardware is excellent." and it
"produced the best images."

If you need to get color or
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— John H. Galligan

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45MB Rem.*	N/A	\$479
88MB Rem.*	N/A	\$649
CD ROM	N/A	\$599
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With *LaserStand*, there's room on one end for two reams of paper and up to 75 envelopes. The other end (*not shown*) holds two extra paper trays. And a convenient side compartment protects, organizes and hides printer cables.

For dot matrix printers, our *Space Saving Printer Stand* is the answer for maximum storage with a minimum footprint.

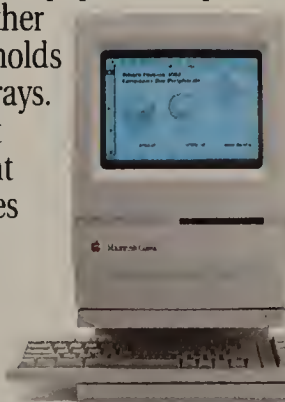
And our award winning *Turbo Mouse®* saves even more space with its superior trackball design.

Unlike many accessories, all Kensington products look like they belong to your Mac. The styling is complementary. The color identical. Even the same material is used.

For a free brochure on our complete line of space saving products, including *Keyboard Shelf*, *Keyboard Slideaway®*, *Maccessories® Tilt/Swivel* and *SuperBase®*, call 800-535-4242. Outside the U.S. 415-572-2700.



Space Saving Printer Stand



Keyboard Shelf

LaserStand



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